

50TH ANNIVERSARY OF THE BIOLOGICAL WEAPONS CONVENTION AND THE SMALLPOX EPIDEMIC IN THE EX-YUGOSLAVIA: EXPERIENCES AND CHALLENGES IN THE NEW SECURITY ARCHITECTURE

Elizabeta Ristanovic¹, Ana Gligic², M.B.Al-Daheri³

¹ University of Defence in Belgrade, Belgrade, Republic of Serbia, elizabet@eunet.rs

² Institute for Virology, Vaccines and Sera “Torlak“, Belgrade, Republic of Serbia,
drgligicana@gmail.com

³ School of Engineering Management, Belgrade, Republic of Serbia, aldaheri@fim.rs

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Abstract: *In the shadow of the still actual COVID-19 pandemic, as well as all its medical, scientific, economic, socio-psychological and geopolitical consequences, 50 years have passed since the smallpox epidemic in the former Yugoslavia. In this year we are also celebrating the 50 th Anniversary of the signing of the Biological Convention. Smallpox is a class A biological agent with potential aerosol transmissivity, high infectivity as well as relatively high fatality rate. That is exactly why it is extremely important to remember the readiness and efficiency of the Yugoslav reaction in suppressing this epidemic and all the controversies that followed it. Lessons from that period can be still used today, half a century later, as a guide for the effective preparation for the management in such situations. Unfortunately, biological weapons are becoming more and more important in the modern hybrid wars, especially in the time of great precomposition of the world, which is moving towards its multipolarity. The power of microorganisms is clearer to everyone, especially in the context of the opportunities that development in the field of biomedicine, molecular biology, bio- and nanotechnology opens up in that context. The question of bioweapons becomes again a subject of conflict between the great superpower. In relation to the 50th anniversary of the signing of the Biological Convention, it is a real time for question of why an independent international body under the auspices of the UN has not yet been constituted to deal with the prevention of the proliferation and use of biological weapons? Pandemics and epidemics will certainly occur in the future, because it is a law of nature, a consequence of migration, climate change, but microorganisms can certainly be misused as weapons in war and in the hands of terrorists. That is why it is important to work on improving the capacity for prevention and response in such situations. This primarily refers to the intelligence and security sector, but also scientific and research resources, well-organized and prepared military and civilian healthcare, the ABHO service, as well as the crisis response and communication system. Lessons learned from previous epidemics - smallpox and COVID-19 should*

certainly be analyzed in detail and critically in order to enable the preparation of the resources for the more efficient and organized reaction in the event of the appearance of such or even more dangerous pathogens.

Keywords: *epidemic, pandemic, smallpox, COVID-19, biological weapons, Biological Weapons Convention*

(introductory lecture of the forum - work by invitation)

1. INTRODUCTION

Since the anthrax campaign of 2001, which followed the terrorist attack in New York and Washington, the issue of weapons of mass destruction (WMD) began to occupy an important place in the international narrative and became a formal reason for many conflicts that were initiated in different parts of the world. Epidemics of SARS in China in 2003, then avian and swine flu, as well as the latter epidemic of the Zika virus in South America, with the socio-political framework of their occurrence and all the implications, as well as the quick and radical changes in attitudes and definitions of pandemics by the WHO, and the strengthening of the budget for biological defense in the leading superpower of the world, indicated to attentive analysts, but also to security-enlightened people from the medical profession and science, that in the coming times, the occurrence of more serious epidemics and/or pandemics can be expected, for which the societies should prepare in time by analyzing previous experiences, by following the latest achievements of science, by investing in one's own knowledge and intelligence, but also by preparing a response strategy in crisis situations caused by such an event. An important prerequisite for that was raising the awareness of the experts, the security sector, but also decision-makers, who often did not pay special attention to this problem.

Then came the SARS-CoV 2 virus or COVID-19 pandemic with all the health, socio-psychological, economic and geopolitical controversies that accompanied it and the questions it raised. The spread of panic, fear, inexplicable restrictive measures, misuse of terms, medical unanimity opposed to the basic knowledge of medical microbiology and immunology, the race in the production of vaccines that soon took on the proportions of a real geopolitical game reigned in the international public discourse.

The analysis of scientific papers published in high-indexed journals on the eve of the pandemic (2016-2020) showed that in fact a large number of experts and teams of institutes in the most developed countries of the world were engaged in the crossing and recombination of different coronavirus strains, examining the transmission routes and virulence, the immunopathogenesis as well as the effects of monoclonal antibodies and known antiviral agents. The research teams and the financiers of such research were interesting. The simulation conducted at the prestigious John Hopkins University was particularly interesting, as well as the discussion at the Munich Security Forum held just before the global lock-down.

The management of the crisis inevitably influenced the results of the elections that were held that year in 70 countries of the world, including the most powerful ones, such as the USA. The greatest absence of international solidarity was shown by those who declaratively advocate the most for universal values, while the People's Republic of China made the greatest strides in medical diplomacy and helping others.

Experience has also shown that countries that had preserved the rests of the former socialist system with an emphasis on public health, as well as knowledge from the former concept of civil protection, in the existing circumstances responded most effectively to the challenge of the pandemic. Our country was among them.

We will remind here to the most important facts and experiences in the fight against smallpox, which are still unique and relevant, even though exactly 50 years have passed since this event. Namely, it was the largest post-war epidemic in Europe, during which 175 patients were officially registered, 35 of them died. This epidemic was specific for the time of its appearance, the affected territory, dimensions and some epidemiological characteristics, but also for the well-organized, synchronized and efficient reaction of the competent services in the fight against it. Experiences and lessons learned from this epidemic can be a significant and valuable contribution to the global fight against smallpox, which again represents a serious threat, as well as for work in emergency situations.

Smallpox is one of the deadliest diseases in human history. It is believed that it appeared for the first time around 10,000 BC in northeastern Africa, from where it spread to the Far East, all the way to India and China. It caused frequent epidemics during the Middle and New Ages. At the time when European colonizers were conquering the New World, smallpox was a powerful biological weapon to subdue the mighty Aztec and Inca empires and destroy the Indian tribes. During the 20th century, the smallpox virus caused 300-500 million deaths worldwide. This is precisely why the WHO started a global campaign to eradicate smallpox in 1967, during which all current and potential hotspots were covered by vaccination. The campaign was successfully completed in 1979. It was then agreed that only two laboratories in the world (Vector Institute in Novosibirsk, in the then USSR, Russia and CDC Atlanta, USA) would retain the variola virus, while the others must destroy it. After eradication, mass vaccination was stopped. The vaccination is recommended only to protect laboratory personnel from possible infection with other orthopoxviruses (vaccinia virus, monkeypox and other poxviruses).

Due to its microbiological characteristics, the possibility of aerosolization and interhuman transmission, as well as resistance to the environmental factors, smallpox virus is classified as a class A potential biological agent. According to the available data, this virus entered the biological weapons arsenals of the most powerful countries in the world during the Cold War and was the subject of serious research, including its cross-recombination with the Ebola virus. The world's population is generally sensitive, since vaccination against the variola has stopped after eradication, the mortality rate is high, and there is no specific therapy. In the last years of the 20th century, it was registered the intensive production of variola vaccine in some countries of the world. Given that it is a highly contagious pathogen, where one infected person can transmit the infection to 10 to 20 others, and therefore special protective measures are needed in the treatment of patients (isolator rooms with negative air pressure and adequate protective equipment) as well as in microbiological work with material samples (laboratories with the highest, fourth level of protection), in case of its appearance, it could be expected huge problems in the work of both health and all other public services.

In today's world of global contradictions, the use of biological weapons represents a real danger, both in war and in bioterrorist actions when this agent can be found in the hands of individuals or groups with vicious intentions over which no one has control. Considering all the above, it is extremely important to raise awareness of this problem, monitor the epidemiological situation and implement preventive measures, and above all to have adequately prepared human and material resources for dealing with the occurrence of the disease. In this connection, the unique experiences and lessons learned from previous epidemics and the response of competent services in those situations are also valuable.

The smallpox epidemic that affected the former Yugoslavia in 1972 was suppressed quickly and efficiently, due to the joint efforts of specially formed anti-epidemic bodies at all levels,

the good organization of health services, the support of the Yugoslav People's Army, as well as international solidarity and WHO assistance.

It was the largest post-war epidemic in Europe. Even then and today, there were doubts and speculations that it might have been a bioterrorist attack on Tito's Yugoslavia, although scientific facts do not support this claim. A total of 175 people fell ill, and 35 people (20%) died. Among the patients there were 99 (56.6%) men and 76 (43.4%) women. Most of the sick were in the Republic of Serbia, 174 people, while one case was recorded in Montenegro. Since the last case of smallpox in Yugoslavia was recorded even four decades before this epidemic (1930), doctors did not have practical experience in diagnosis, nor sufficient knowledge of the facts related to epidemiology and the fight against this quarantine disease, so the clinical diagnosis of the disease was established late.

Epidemiological and serological tests showed that the pilgrim-hajji Ibrahim H. from the village of Danjane (SO Orahovac) near DJakovica, brought the smallpox into Yugoslavia. He visited Mecca and Medina (Saudi Arabia) with 24 other hajjis and returned by bus via Iraq, visiting a dervish sanctuaries in the vicinity of Basra and Baghdad where there were several cases of smallpox in that period. Upon his return to the village, according to his own account, Hadji fell ill with a clinically undiagnosed illness (fatigue, chills, shivering), and he also had several small pimples on his face. However, during the examination, a month later, no scars were found on his face and body, nor were there any traces of vaccination, even though it was carried out in December 1971 at the Institute for Health Care in Skopje (Macedonia). By the way, all participants of the Hajj were previously vaccinated with a lyophilized domestically produced vaccine (Immunobiological Institute in Zagreb (Croatia)), as well as against cholera. The success of the vaccination was not controlled. By testing of the sera of the passengers who traveled to Hajiluk by the same bus, it was determined that 20 of them did not have a satisfactory vaccination antibody titer, which opened some questions related to failures in the implementation of immunization measures.

By the way, in Yugoslavia were conducted the measures for control of travelers coming from infected areas. Pilgrims were treated as a particularly risky group. They usually went on the pilgrimage in an organized manner, by plane, with prior sanitary treatment, health control during the journey, as well as health supervision upon return, which was generally carried out in agreement with the Islamic community, but there were also private arrangements, as this one. The fact that in the WHO report Iraq first appeared as an infected area in the first half of March 1972, and that the disease existed two months earlier, had a negative impact on the epidemiological research of the monitored groups, as well as the fact that the first case of the disease was atypical. All the pilgrims stated that they were healthy during the journey. They were revaccinated during the epidemic. Serological examinations were performed before revaccination at the Torlak Institute in Belgrade, as well as at the smallpox laboratory of the Center for Disease Prevention and Control (CDC) in Atlanta (USA). The results showed significant differences in the positive findings of Ibrahim H. compared to the serums of other pilgrims. Based on this, it is considered to be the most likely source of infection (index case).

The epidemic developed in the territory of the province of Kosovo in three generations. The number of secondary diseases from one source of infection was closely related to the length and intimacy of contact between patients and susceptible persons, and it depended on the clinical form and stage of the disease. Patients with typical changes on the skin and mucous membranes usually caused the largest number of secondary diseases. However, the patient Ljatif M. from Novi Pazar, the first contact with the index patient, with a hemorrhagic, always fatal, but unrecognizable form of variola, and under the diagnosis of a severe allergy to penicillin, walked through several health institutions and in direct contact infected a total of

38 people, which represents the largest number of infections from one person recorded in the world literature.

In this epidemic, differences in the length of incubation between vaccinated and unvaccinated individuals were not observed. Of all 175 patients, 105 (60%) were previously vaccinated, 66 (37.7%) were unvaccinated, while 4 (2.3%) had no known vaccination status. Here it is necessary to point out the big difference in lethality between previously vaccinated (8%) and non-vaccinated persons (35%). It is worth mentioning that 52% persons were infected outside the hospital, while 48% were infected in hospitals. The exception was the hot spot in the province of Kosovo. There were twice as many outpatient cases, which was atypical. By the way, the common characteristic of post-war smallpox epidemics in Europe was that most of the patients were infected in hospitals (index 2.4:1.6), while the situation was reversed in the case of the epidemic in Yugoslavia (index 1.1:2.0). Another specific characteristic of the epidemic in the province of Kosovo, was related to the fact that the focus for intrahospital infections in this area, in addition to the infectious one, was also the delivery department, although the exact way of introducing the virus into the maternity ward has not been determined. Otherwise, the characteristic of the epidemic was a large number of infected infants (14).

Vaccination in the first hotspots started on March 16, one day after the virological confirmation of the disease. By the decision of the competent authorities, the Federal Epidemiological Commission, vaccination was extended to the entire vulnerable population of Yugoslavia, so that a total of 18 million people were covered by this measure. Along with vaccination, treatment with hyperimmune anti-smallpox serum was carried out, especially in cases where the vaccine was an insufficiently safe prophylactic. Detailed records of vaccinations and post-vaccination complications were not kept.

All health institutions in the country were taking adequate measures to fight against smallpox. Health surveillance of hotspots in the province of Kosovo included daily visits to residents, temperature measurement and inspection of the skin and oral mucosa. In the search for contacts, nearly 3,000 surveys were conducted in Belgrade alone. Contacts were taken care of in special quarantine institutions, but there were also quarantines of individual households and entire villages. Since primary vaccination after contact was the main protective measure, many prime-vaccinated people who came into contact with sick people did not get smallpox at all. However, primary vaccination after contact in the Yugoslav epidemic did not have a greater impact in terms of the occurrence of milder clinical forms of the disease, which was in contrast to the then available literature data.

The microbiological diagnostics was performed in the laboratory of the Torlak Institute for Immunobiology and Virology in Belgrade, whose experts were specially trained to work with dangerous pathogens. The facility was founded in 1966. In 1967, the Marburg virus imported from Africa was identified there. The laboratory team consisted of 3 experts and 1 mid-level medical worker in charge of virological work and two experts in electron microscopy. Immediately after the outbreak of the epidemic, a state of emergency and a 24-hour duty regime were introduced in the Laboratory. The team of experts has been strengthened. During the processing of materials, a special regime of personal and collective protection was organized in the laboratory (suits, coats, masks, glasses, gloves, boots, bathing after work, permanent disinfection of working rooms, strictly controlled transfer and sterilization, i.e. burning of all infectious objects and limiting personnel contact with the outside environment). In this regard, it is important to mention that not a single case of laboratory infection was recorded in the laboratory, which speaks in favor of good training and work organization, considering that biological safety standards were not exist at that time.

By the way, the smallpox epidemic happened before the beginning of the tourist season, so its quick suppression was also extremely significant from that aspect. It was sociopolitically significant that the country was entering a period of destabilization, because the Constitution of 1974 which paved the way for the degradation of the state was being prepared. Preparations for the 80th birthday of the Yugoslav Marshal were not interrupted, despite the epidemic. In the same year the British Queen Elizabeth came to an official visit. Schools, colleges and cultural institutions were working normally during the epidemic. The public was informed by competent experts about the spreading of the disease and the measures that should be taken, and corresponding Bulletins were published in the daily press. The WHO was also informed about all this, and for the purpose of coordination and objective information of the world public, the competent experts of the WHO were invited. The work and coordination of all management bodies and state administration bodies responsible for health affairs were at an enviable level. The Federal Executive Council monitored the work and gave full support to the Federal Headquarters for the fight against smallpox, whose task was to collect and publish data on the movement of the disease, coordinate the work of the republican and provincial headquarters, procure and distribute vaccines and other resources, and take other measures based on the assessment of epidemiological situations. It can be said that the Yugoslav health service quickly and efficiently carried out the task of suppressing the smallpox epidemic, which was also large in terms of the number of cases (175) and by geographical spread (25 hotspots). The exceptional dedication of health workers and other social entities, as well as the disciplined behavior of the population, certainly significantly contributed to this.

It is also important to point out what the media image was like during the smallpox era. The first information on Radio-Television Belgrade appeared seven days after the confirmation of the infection, although CNN immediately when the virus was seen under the electron microscope in Torlak announced the news about the appearance of smallpox in Yugoslavia, which raises many questions, primarily of a security nature. Information about the spread of smallpox was broadcast daily until April 15, after which it was reduced to sporadic. It is interesting that the Relay of Youth started on that day from Iriski venc. During the previous period, half-hour or one-hour shows were organized every day, in which selected ministries or doctors carefully disseminated information about people's behavior and the fight against smallpox. Trust in the health system, official bodies and the state was extremely high, so all measures were implemented more easily. An inspection of the program archives revealed that there were also critical, but well-intentioned attitudes. Marshal Tito never appeared on television during the epidemic. The last patient was discharged from the hospital on May 19, while seven days later was celebrated his birthday.

In summary, our health care and the whole of Yugoslavia gained an extremely high reputation in the world due to the extremely effective fight against smallpox, and the lessons learned are still extremely current and represent a roadmap in the fight against future epidemics/pandemics that will certainly occur, either due to environmental laws of nature or as a result of human actions.

In the year of 50th anniversary of signing the Biological Weapons Convention, which prohibits the possession, use and transfer of potential biological weapons, it seems that the same is becoming more and more relevant. Not only the experiences and challenges of the COVID-19 pandemic, the discussions at international economic and security forums, simulations of future pandemics, the incomes of multinational companies, but also the geopolitical gambit we live in impose numerous open questions. In this connection, the issue of biolaboratories in the territory of Ukraine and the former Soviet republics, in the vicinity of the People's Republic of China as well as in Central Africa, their activities, and the ways of financing their projects is also very relevant. Russia has recently presented evidence, the US indirectly confirmed

involvement, and the People's Republic of China is seeking clear answers to the questions raised within the UN Security Council. It is indicative that this body reacted much more expeditiously in the past when some others made accusations that were used as an immediate reason for bombing of the sovereign countries. The possible reasons for the construction of such laboratories could be: a-dislocation of potentially dangerous research prohibited by the Convention outside its own borders, b-examination of the epidemiological-epizootological situation on the ground that is of strategic interest and the occupation of which is planned, and c-collection of biological material of a certain population in order to possibly improve biological and ethnically specific weapons. Taking into account the real threat, the question arises why no truly independent control expert body has been constituted within the UN until now in the framework of the Biological Convention, whose signature depositaries were the USA, USSR and Great Britain, and which entered into force in 1975. The main task of this body would be the control of implementing of the provisions of the Convention, which now resembles a gentleman's agreement rather than a binding legal act. Such bodies exist within the framework of the Chemical and Radiological/Nuclear Convention, but despite the numerous resolutions of the UN Security Council, which deal with the issue of biological threats, the analogue body has not been constituted so far. Perhaps the right time for a diplomatic initiative in this direction is right now, when the world is at a major turning point. It is the joint task and obligation of scientists, the security-intelligence system, as well as decision-makers, at the national and international level. Any other outcome would pose a real danger of turning the world into a new microbiological Chernobyl.

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