NEW CORONAVIRUS DISEASE: FROM THE BIOLOGICAL WARFARE PERSPECTIVE

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Biological warfare is the use of living microorganisms or materials derived from them (toxins, genetically modified organisms) for military or terrorist purposes to cause death or incapacitation in man, animals or plants. The deliberate use of microorganisms and toxins as weapons has been attempted in various periods throughout history (Table I). Many biological agents including bacteria, viruses and toxins shown in Table II can be used as biological weapons which have emerged as significant threat in the last decade and their uses in future wars and terroristic attacks still remain a realistic concern. Since having biological warfare program is still currently threat and our country is located in the "hot region" of this program, this issue has to be taken into consideration with great extense.

Table I. Historical use of biological weapons:

- Tatars attempted to infect the enemy by catapulting bodies infected with bubonic plaque over the walls of the city of Kaffa-Kırım (1346).

- As an "act of good will", the British soldiers gave blankets used by smallpox victims to the Native Americans (1754).

- On 17 June 1925, the Protocol for the Prohibition of the Use of Bacteriological Methods in War, commonly called the Geneva Protocol, was signed.

- At least ten thousand prisoners died and 11 Chinese cities were attacked with biological agents manufactured in a biological warfare research facility in Pingfan, Japan (1932-1945).

- US started to conduct a biological warfare program in 1943 in Camp Detrick, Maryland and made research on anthrax, brucellosis, Venezuelan equine encephalitis, Q-fever, botulism and tularemia until 1969.

- Thousands of people were reported to be killed due to attacks of Tricothecene mycotoxins known as Yellow Rain in the war in Southeast Asia (1974-1981).

- As a follow-on to the 1925 Geneva Protocol, the 1972 Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological and Toxin weapons, commonly known as Biological Weapons Convention was convened.

- A Bulgarian exile named Georgi Markov was attacked in London with an umbrella weapon filled with Ricin (1978).

- A mysterious explosion at the Soviet Institute of Microbiology and Virology in Sverdlovsk caused at least 66 persons to die (most with inhalation anthrax) (April 3, 1979).

Table II. Some types of organisms having potential biological warfare applications.

A. Bacteria:

Bacillus anthracis

Brucella abortus, B. melitensis, B.suis

Chlamidia psittaci

Clostridium botulinum, C. tetani

Francisella tularensis

Pseudomonas mallei

Salmonella typhi

Shigella dysenteria

Vibrio cholerae

Yersinia pestis

B. Rickettsiae

Coxiella burnetii

Rickettsia prowasecki, R. rickettsii, R. quintana

C. Viruses

Congo-Crimean haemorrhagic fever virus

Venezuelan equine encephalitis virus

Lassa fever virus, Ebola virus

Dengue fever virus

Variola virus

Yellow fever virus

D. Toxins

Botulinum toxins

Clostridium perfringens toxins

Ricin, Saxitoxin

Staphylococcus aureus toxins

Trichothecene mycotoxins

Aflatoxins

E. Genetically Modified Microorganisms or genetic elements **that contain nucleic acid sequences associated with pathogenicity and are derived from organisms.**

Because of the characteristics and variabilities of biological weapons, no accurate preventive measure can be stated in practice at all. However, biological defense includes some measures minimizing the threat and the effects of biological attack which need to be planned and organized as summarized in the following:

1. Developing an effective intelligence system and information network: Follow-up of the countries likely conducting a biological warfare program and evaluations of health statistics and epidemiological data in a certain area should be such a warning and alerting matters to lead the State and public to be prepared for such an attack.

2. Quarantine and isolation: A detailed quarantine policy and controlling mechanism is a great concern for the government in peace time. Isolation methods like protective equipment and collective protection systems including shelters should also be developed and established.

3. Improvement of rapid and advanced diagnostic systems and facilities: Biosensors and fully automated biodetectors for real time sample collection, detection and identification in the field have been developed. On the other hand, a miniature flow cytometer (known as miniFlo) using an immunoassay system and a portable PCR identifying the DNA inside the cell are also available for the detection and identification of biological warfare agents.

4. Improvement of prevention and treatment protocols and facilities including vaccination: Since biological agents are not only easy and cheap to be produced, but also difficult and expensive with respect to prevention and treatment, more appropriate method for reconnaissance and treatment including isolation procedures, antibiotic therapy, antiviral therapy, antitoxin therapy and vaccination has to be determined, and researchs have to be performed in coordination with the mentioned requirements.

5. Effective health organization and training: Organizations and institutions related to the Biological Defense System should be determined and integrated to the system with the establishment of coordination amongst them. Diagnostic facilities and laboratory services including on-site sampling and sample transportation should be developed by some certified health care providers.

New Coronavirus Disease

The COVID-19 virus, which appeared in Wuhan, China in December 2019, has spread rapidly all over the world. As of 21 April, 2020, when these lines were written, the virus diagnosed in more than 1,5 million patients in 210 countries worldwide caused more than 175 thousand people to die. While the outbreak of China was relatively relieved, the focus was on Europe since February. With March, the number of cases in the United States (USA) began to increase rapidly. Curfews have been organized in many countries, especially in England, Italy, France, and Poland, in order to struggle with the epidemic.

Realizing that the virus has the characteristics of “human-to-human” transmission capability, World Health Organization stated the disease as a Public Health Emergency of international concern on January 31, 2020. These findings were much enough to demonstrate the severity and complexity of the outbreak. Given the fact that no effective medicine is available for viral infectious diseases, some other remediations including preventive measures like control of the source of infection, early detection of patients, cutting off transmission, and protecting susceptible population are essential. Although medical institutions and healthcare

staff are the main force fighting the disease, public contribution is also mandatory for a rapid epidemic control.

Figure:

The survival time of the novel coronavirus at different environmental surfaces with different temperatures is as in the list:

Different environments	Temperature	Survival time
Air	50 ~ 59°F	4 hours
	77°F	2 ~ 3 minutes
Droplets	<77°F	24 hours
Nasal mucus	132.8°F	30 minutes
Liquid	167°F	15 minutes
Hands	68 ~ 86°F	<5 minutes
Non-woven fabric	50 ~ 59°F	<8 hours
Wood	50 ~ 59°F	48 hours
Stainless steel	50 ~ 59°F	24 hours
75% alcohol	Any temperature	<5 minutes
Bleach	Any temperature	<5 minutes

Virus generally can survive for several hours on smooth surfaces. If the temperature and humidity permit, they can survive for several days. The novel coronavirus is sensitive to ultraviolet rays and heat. Sustained heat at 132.8ºF for 30 minutes, ether, 75% alcohol, chlorine-containing disinfectants, peracetic acid, chloroform, and other lipid solvents can effectively inactivate the virus.

With respect the risk management, winter is the season having tendency to see the high prevalence of respiratory viruses such as influenza, and various other respiratory infections that may occur. This made it difficult to differentiate the early stage of COVID-19 from other upper respiratory infections. The main sources of infection in community-acquired pneumonia include patients, their families, visitors, and their living environment. The dissemination and outcomes of community-acquired pneumonia are associated with the following factors.

(1) Environmental conditions: air pollutants, overcrowding in confined spaces, humidity, indoor hygiene, seasons, and temperature.

(2) Accessibility and effectiveness of health care services and infection prevention measures: Accessibility and availability of vaccines and health care facilities, and isolation capabilities.

(3) Host factors like age, smoking habits, transmissibility, immune status, nutritional status, previous infection or co-infection of other pathogens, and overall health.

(4) Pathogen characteristics: routes of transmission, infectivity, virulence, and microbial population.

Some main Recommendations to keep ourselves away from the novel coronavirus	(1) 2019-nCoV is mainly transmitted by droplets and contacts, therefore medical surgical masks must be worn properly. (2) When sneezing or coughing, do not cover nose and mouth with bare hands but use a tissue or a mask instead. (3) Wash hands properly and frequently. Even if there are viruses present on hands, washing hands can block the viruses from entering respiratory tract through nose or mouth. (4) Boost your immunity, and avoid going to crowded and enclosed places. Exercise more and have a regular sleep schedule. Boosting your immunity is the most important way to avoid being infected. (5) Be sure to wear the mask always! Just in case you come in contact with an infected person, wearing a mask can prevent you from inhaling virus-carrying droplets directly.

The exceptionally high rate of spread of the COVID-19 epidemic and the mortality rate, especially among people with a history of elderly or chronic disease, brought the health system of many countries to the side of collapse. Another factor that increases the severity of this situation is the increased risk of healthcare professionals who are in need of dealing with a very large number of patients in a short time. As a matter of fact, a large number of medical personnel died in Italy and China during the fight against the epidemic. The epidemic has ceased to be only a public health issue in a very short time: the crisis management capacity of governments

has gained long-term effects and long-term effects in many areas such as national and international economy, trade and security.

Italy is one of the countries heavily affected by the epidemic. The number of patients, which showed a large increase in a short time, paralyzed the Italian health system. Due to this situation, medical equipment, materials and personnel assistance from different countries were sent to Italy, which requested assistance from the international community. One of the countries sending aid was Russia. However, the content of the aid and the way it was reflected in the press seemed to herald the transformation of defense and security issues in the world after COVID-19.

From March 22, Russia started to Italy for heavy transport aircraft and military medical personnel specialized in sanitary materials, decontamination devices, diagnostic kits and anti-virus and epidemics. These staff, along with the Italian armed forces and paramedics, started the aids to the sites movement, which were most severely affected by the outbreak.

Similarly, the security of army units of countries such as England, USA, Germany, first aid, field hospital, patient and material transportation. The US Navy sent two floating hospital ships off COVID-19 New York. The French Navy also used the Mistral-class helicopter landing ship COVID-19 to evacuate patients from the mainland.

At least, when the disease first appeared in January, no one predicted that it would have had as much of an impact as it is now seen because the initial data and initial information from China was not very healthy. In other words, the seriousness of this business was understood as it came to the center of Europe a little like the end of February and then after the epicenter jumped to the United States, and the economic shock started to become more obvious after this stage. It was a rare shock in world history. The crisis we are experiencing now actually reflects and reflects the great shock of this economic imbalance. We are experiencing one of the periods in the first quarter of the year in terms of growth or in the first half of the year, when the global economy is shrinking sharply.

Even the estimates will be higher than the contraction. In some places there are places where people are not able to do even if there is demand because work is not possible due to health work, because it is in some areas such as some basic food, medicine, etc. It is necessary to disappear gradually only with a relief on the health side.

It is not possible to know exactly the economic damage of the coronavirus pandemic. But, it is possible to make some predictions, if not possible. Even if the measures taken are

taken into consideration, it is becoming increasingly clear that the world will suffer more seriously than during the financial crisis between 2007-2009. The result is: when people lose their jobs, they consume less goods and services. Thus, the economy weakens. As the idea suggested, workers this year ranged only from $ 860 billion to $ 3.4 trillion. They can lose their income from labor, prolonging the negative effects of the current recession and the deepening of the crisis may occur.

In the light of these foresights , possible developments and transformations that may occur in the defense and security environment after COVID-19 can be said in the following:

1. The strategic - political importance of the armed forces in the "non-war operation" (Operation Operations) missions was once again demonstrated. "Semi-diplomat" can be expected to give special importance to educational promotion, diagnosis and preferences.

2. In this direction, transport aircraft that can carry large loads over long distances, large-capacity military transport and hospital ships; More resources can be allocated for the development, production and modernization of existing sanitary infrastructure, hospitals and similar tools and equipment that can be quickly transferred and installed quickly in field conditions.

3. COVID-19 can be allocated larger resources to military and civilian research projects in genetics, microbiology, nanotechnology to combat viruses. It is possible that the activities that can increase in these areas will have side outcomes in the military and civilian areas in the medium and long term.

4. The assistance provided by Russia and China to European countries in the context of combating the epidemic, military and civil diplomatic relations established before, during and after these aids can trigger transformation and changes in European geopolitics.

What is expected in the near future:

- More cases are likely to be identified in the coming days, including more cases in the world.
- It's also likely that person to-person spread will continue to occur, including in the most affected countries.
- Widespread transmission of COVID-19 in the world may occur through large numbers of people needing medical care at the same time.

- Schools, childcare centers, workplaces, and other places for mass gatherings may experience more absenteeism.
- Public health and healthcare systems may become overloaded, with elevated rates of hospitalizations and deaths.
- Other critical infrastructure, such as law enforcement, emergency medical services, and transportation industry may also be affected.
- Health care providers and hospitals may be overwhelmed.