



Critical Analysis of Biological Warfare

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ABSTRACT

Biological warfare is use of microorganisms such as virus, bacteria, fungi or toxin found in nature that can used to kill or injure human, animal or plant. The possibility that biological agents will be used against us is no longer unthinkable. The threat of biological warfare has increased over the past two decades, with a number of countries working on offensive use of these agents. Allegations of biological attacks have been made since World War I; however, most of these have not been confirmed. Biological warfare has been renounced by more than 150 nations, primarily for strategic and other pragmatic reasons. The terrorist activities will increase day by day that will involve bombs and firearms not only this but, also include biological agents. There is also a certain amount of concern over the possibility that terrorists might use biological agents to threaten either military or civilian populations.

Keywords: Biological warfare, Microorganism, Biological agents, World War I.

INTRODUCTION

The biological toxins or infectious agents such as used with the intent to incapacitate humans, animals or plants or to kill them as an act of war is known as Biological Warfare (BW) or Germ Warfare. The biological weapons such as bacteria, viruses, insects, and fungi are living organisms which carries the fast capacity to replicate. Either by actual deployments or by just threats, to defeat enemy these biological weapons/agents maybe employed in various manners. These biological weapons can also be utilized as area denial weapons. The targets of such bio-weapons may be a single individual, a group of people, or can even be used against entire population. These agents are toxic and can be lethal or non-lethal. They can be deployed by nation states or by non- national groups and can either be developed or acquired. (Wheelis et.al, 2006)

Biological warfare and chemical warfare share a common background as the toxins produced by some of the living organisms that are used as war and they are considered under the provisions of both the Biological Weapons Convention and the Chemical Weapons Convention. These psychochemical weapons and toxins are often known as midspectrum agents. Unlike bioweapons, these midspectrum agents do not reproduce in their host and are typically characterized by shorter

incubation periods. (Gray, 2006)

The international humanitarian law and other international treaties prohibit the use of biological weapons and their use in armed conflict has been declared a war crime.(Alexander, 2017)

HISTORIC BACKGROUND

A number of confounding and opposing factors make it difficult to assess the history of biological warfare. These include:

The dearth of relevant microbiological or epidemiological data, the prevalence of naturally occurring endemic or epidemic diseases during conflicts, hindrances in verification of alleged or attempted biological attacks and the claim of allegations of biological attacks for propaganda purposes. The use of biological weapon is not a novel concept (Robertson, 1997) and history is inundating with examples of their use since antiquity. Scythian archers dating as far back as 400 BC in decomposing bodies or in blood mixed with manure to make infections (Christopher et.al, 1997) . Persian, Greek and Roman literature from 300 BC quote the use of animal cadavers to contaminate sources of water.

Blankets infected with small pox were distributed by British forces in 18th century AD to Native Americans to

spread the disease. In First World War, Germans developed biological weapons using ganders, anthrax, cholera and a wheat fungus. During Second World War, Japanese carried out human experiments with plague, anthrax, syphilis on Chinese prisoners under secret biological warfare research (Mobley, 1995). During 1940s, 50s, and 60s, research on aggressive biological weapons like anthrax and botulinum toxin continued in the United States and Britain. In 1970s, the alimentary toxic aleukia (ATA) caused by yellow rain was suspected to have been developed by USSR and its allies during their campaigns in Cambodia and Afghanistan in civilians. In September, 1984, 751 persons were infected with Salmonella typhimurium due to international contamination of restaurant salad bars in Oregon by followers of Bhagwan Rajneesh. (Torok et. al, 1997)

BIOLOGICAL WARFARE AGENTS - USES AND CONSEQUENCES

In present times, the use of Biological Warfare Agents (BWA) has become quite broad spectrum as their use is not limited to war alone and can be used anywhere and anyone. They can be employed as weapons of mass destruction. Aerosols of biological warfare agents may deliver incapacitating or lethal inoculums over large geographic areas and to bring about mass casualties, the aerosols of BWAs are used to deliver incapacitating or lethal inoculums over large geographic areas. Contamination of food and water is another mode of delivery to targeted population. The use of biological warfare agents has far reaching consequences. The consequences of using BWAs include fear and panic in population, acute and chronic psychiatry disorders and use of threats to gain political advantages etc. Recently, in a short span of time, BWAs are readily adaptable for terrorist operations, owing to their concealed delivery, easy transportation and easy escape of performer before BW agent release is apparent.

Modes of Delivery

BWA belong to unorthodox category of weapons and hence are delivered by unconventional weapons. The method most likely to be used by terrorist and military groups is aerosols spray. Owing to their particle size (1-5 μ m) they are most efficiently delivered to their targets (air sacs of lungs) and can be delivered by unconventional means. The most effective method is aerosol sprays (most likely to be used by terrorists and), because of their particle size due to which they are most efficiently delivered to their target (air sacs of lung). (Eitzen et. al, 1997)

Portal of Entry

Respiratory tract is the main entrance of aerosolized BWA. Others routes include GIT (through contaminated food

and water), intact skin (barrier against most BWA except mycotoxin) mucosal surfaces, (nose/mouth/eyes), and injection (traumatic wounds).

Environmental Detection

Presently there is no dependable detection system in existence for BWA. Some methods which are being developed are as follows –

1. Biological Integrated Detection System (BIDS), it's a multi-component system that enables in sample detection, monitoring and presumptive identification. As it is vehicle based, to detect agents it is located in BW aerosol cloud.
2. A Short Range Biological Standoff Detection System (SRBSDS), to detect aerosol clouds it employs UV and laser-induced fluorescence.
3. A Long-Range Biological Standoff Detection System (LRBSDS), to scan designated area of interest, it employs laser system mounted in a helicopter.
4. Portal Shield System, it utilizes biological and chemical point detectors that are linked to computer control systems.
5. Joint Biological Point Detection System, in presence of BWA, it provides visual and audible alarms and is regarded as an automatic air-sampling device.
6. By Examination of Environmental Samples. Even point source munitions near point of release will leave environmental residue of BWA.

Clinical Recognition or Diagnosis

Unlike chemical agents, which, Diseases resulting from biological agents have incubation period of days which is so unlike the diseases induced by chemical agents, the latter showing violent syndromes within minutes at site of exposure. (Franz et. al, 1997). This attack may not be apparent until days or even weeks after the attack has occurred. Therefore, the first indication that a BW attack has occurred may be large number of patients simultaneously presenting with a similar disease. Early identification of BW attack is confounded by difficulties in early clinical diagnosis. Indications of possible BW agent attack include the following:

1. In a given geographic area, the disease entity is unusual and does not occur naturally.
2. The presence of multiple disease entities in the same patient shows that in the attack mixed agent have been used.
3. When such populations inhabit the same area, there occurs large number of both military and civilian casualties.

4. There are data that suggests a massive point-source outbreak.
5. Apparent aerosol route of infection usually occurs.
6. Occurrence of high mortality and morbidity rates relative to the number of personnel at risk.
7. Such type of illness is limited to circumscribe or fairly localized geographic areas.
8. The personnel who work in areas with filtered air supplies or closed ventilation systems are generally attacked low.
9. In the area of outbreak, competent natural vector is usually absent.

Lab Diagnosis

1. Most of such BWA attacks are clinically recognized.
2. By usual lab tests (ELISA, mass spectroscopy, microscopy, culture, animal inoculation methods, Ab detection, PCR), these attacks are identified and also by the detection of metabolic products of infections in clinical specimens.

Decontamination

The physical process of removal of residual chemicals from persons, equipment and from the environment is known as Decontamination. Every person arriving from biological warfare contaminated area to Medical Treatment Facility (MTF), is regarded as contaminated unless there is positive proof to contrary. (Richards et. al, 1999)

1. Initial decontamination includes removal of all contaminated clothes, removal of the contaminated environment, and copious irrigation with water is likely to be done.
2. The dilute household bleach solution is revised by an exposed person.
3. Patient should be isolated in designed tents and they are placed in PPW (Patient Protective Wrap) for protection from BWA.(Lebeda, 1997)

Prevention

Prevention is done by chemoprophylaxis, active immunization, and personal protective equipment. Protective equipment includes - Military protective mask, Protective Overboots, HEPA filter (High Efficiency Particulate Air) masks, battle dress over garments, Joint service light weight integrated suit technology, and Double layer of battle dress uniform T-shirt.

CONCLUSION

Biological weapons have recently attracted a lot of attention and the resources of the nation. The terrorist activities will

increase day by day that will involve bombs and firearms, not only this but will also include biological agents., and the role of community leaders, media communications, planning for war quarantine and decontamination are important in the migration of psychological consequences. So far 140 nations have participated in the Biological and Toxin Weapons Convention (BWC) which decreases the acquisition of biological materials for hostile purpose and for armed conflict. To manage large scale biological weapon attacks, emergency services must build and maintain.

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