The History of Bioterrorism: An Overview

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In war, the objective is to render the opponent incapable of offering resistance. Conventionally, this is done by killing as many soldiers as possible by force of arms. Artillery, bullets, bombs, hand grenades and landmines all do their bloody duty. However, the theory that biological material can kill more effectively and with less effort, cost and destruction than bullets makes it an attractive alternative weapon. In practice, though, its use has led to many deaths, not just of the opponent, but of friendly forces as well.

Contamination

The history of biological weapons goes back to antiquity. The nine plagues of Egypt may be the earliest form of using nature to gain strategic goals. In Exodus, chapters seven through 12 detail infestations of frogs, lice, flies, locusts and natural disasters such as hail, darkness and a red tide in the Nile. One plague in particular, the “ashes” that caused boils, sounds suspiciously like the modern biological weapon anthrax (Bacillus anthracis). The ultimate biological weapon in the ancient struggle of the Israelites and Egyptians killed the first-born of each house unless the blood of a lamb was apparent over the door frame.

Contamination of potable water, like the red tide of the Nile, has been a major theme in the history of biological warfare. In the 6th century B.C.E., the Assyrians poisoned wells of their opponents using rye ergot. During Greek and Roman times, the first recorded use of biological weapons occurred. Scythian archers infected their arrows by dipping them into decomposing bodies or in blood contaminated with manure. During the Carthaginian Wars, Romans often contaminated wells and food sources with the bodies of dead animals, a practice that was common even in the American Civil War. General Joseph E. Johnson, marching with Confederate troops to reinforce Vicksburg, drove farm animals into ponds and shot them. Pursuing Union General William T. Sherman noted that the stinking carcasses had to be removed from the water, but did not detail any effect on his troops.

Centuries before the Civil War, the development of the catapult ushered in a new era in biologic warfare as plague-infected bodies were hurled into besieged cities. A prime example of the practice occurred at Kaffa (now Feodosia, Ukraine), where the Tartars catapulted plague-infected cadavers of their army into the city. The city was soon emptied, and the inhabitants sailed back to Genoa, Venice and other ports on the Mediterranean, thus spreading the plague to Europe.

Biological Agents as Weapons

Hannibal introduced biological projectiles when he fired earthen vessels filled with venomous snakes into the flagship of King Eumenes II of Pergamon. A more calculated and nasty step in the history of biological warfare is credited to the British in North America. Noting the low resistance of the native population to smallpox, Lord Jeffrey Amherst, commander of British forces in North America, suggested that infected blankets might be given to the Indians to “reduce” their numbers. An outbreak of smallpox at Fort Pitt presented the opportunity. Captain Simeon Ecuyer, one of Amherst’s subordinate officers, gave blankets and handkerchiefs from the smallpox infirmary to the natives. Within a few months, smallpox was raging among the native populations.
During World War I, the Germans planned to use anthrax against the reindeer population of Norway, against Romanian sheep headed for Russia and against Argentinean livestock purchased for use by the British and Indian armies. Unsuccessful attempts were made to contaminate cattle and horse fodder bound for England by the German military attaché to the United States, Major Franz von Papen. Perhaps more disturbing, the German consul in Zurich was found, after the armistice, to be preparing _vibrio cholera_, for dispersal in Italy.\(^3\)

World War II could have been a biological warfare nightmare. The Japanese began systematic research into biological weapons in 1931.\(^7\) Shiro Ishii, who became a lieutenant general in the Imperial Japanese Army, directed the efforts. Prisoners, including American prisoners of war, were used as human guinea pigs in this often overlooked story of an extremely heinous war crime. The Japanese used biological weapons against the Chinese, including scattering plague-infested fleas over the towns of Chuhsien and Ningpo. Ishii gave Nanking children chocolate candy laced with anthrax in July of 1942. Fearing that the information learned by the Japanese would fall into the hands of the Soviets after the end of World War II, the Japanese generals responsible for this murderous conduct were never brought to justice.\(^8\)

Britain and America developed centers for research into biological weapons. No weapons were actually produced, aside from a stockpile of anthrax-laden cattle feed that was never used. The British did test anthrax bombs on Gruinard Island, a remote island off the northwest coast of Scotland. Wishing to see the effect of the bombs on sheep, the British got more than they bargained for, and the island was uninhabitable for more than 45 years. A notable biological weapon tested by the British was a botulin toxin-impregnated grenade that was used in the assassination of the infamous Nazi, Reinhard Heydrich. Although Heydrich’s wounds were comparatively minor and certainly not life-threatening, he died unexpectedly and in a manner consistent with botulism poisoning several days after the attack.\(^9\)

**Post-World War II**

Many allegations of biological warfare have surfaced from the Korean War. It is difficult to tell what truly happened as both China and Korea were in need of major public health initiatives, and Koreans would often fertilize their crops with raw human waste. On February 22, 1952, North Korea claimed the United States had dropped cholera and plague-infested insects over their territory. China made similar allegations, but nothing was ever proven.\(^5\) During the Vietnam conflict, the Vietcong used feces-impregnated punji sticks to make their booby traps more lethal.\(^4\) Allegations surrounding “yellow rain” in Vietnam and during the Soviet invasion of Afghanistan continue to surface. Yellow rain, which is aerosolized trichothecene mycotoxin, causes severe necrotic ulcers to develop in the nose, mouth, throat, stomach, gastrointestinal tract and kidneys.\(^5\)

During the Cold War, the United States Army wished to test the vulnerability of the United States to a biological warfare attack. In September 1950, _Serratia marcescens_ and _Bacillus globigii_ were released from ships in the San Francisco Bay area. Although thought to be harmless, an outbreak of infections with both agents soon followed, including one death. In 1960, light bulbs filled with _Bacillus subtilis_ were dropped into ventilation shafts in the New York subway system. Passengers brushed off the powder and continued on unaware. The bacterium soon spread through the subway system.\(^9\)

The former Soviet Union had, and may continue to have, a large commitment to biological weapons development and deployment. Ken Alibek, who ran the Soviet’s system in the late 1980s and early 1990s, has detailed the ingenuity of Soviet scientists. They developed a frightening array of biological weapons that included an antibiotic-resistant anthrax, plague and tularemia weapons and viral weapons using smallpox, Ebola and the Marburg virus. The current whereabouts and careers of many of the scientists from the Soviet program remain unknown, lending credence to the possibility of their employment in Iraq, Iran or other known terrorist states.\(^10\)

**Conclusion**

The history of biological warfare is frightening and real. The United States is in the midst of a crisis and remains vulnerable to biological attack by a determined enemy. Caution must be taken and the sensitive areas of our public health, utility and transportation systems secured. In many ways, scientific discovery has outpaced defensive capability. It is a 21st century reality with which we all must live.

**References:**


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Greater Washington Society of Anesthesiology, The Maryland/D.C. Society of Anesthesiologists, The Washington, D.C. Area Critical Care Society, The Johns Hopkins Department of Anesthesiology & Critical Care Medicine and The Walter Reed Army Medical Center Department of Anesthesiology. During the month prior to Roger Morris' untimely death, the Medical Preparedness Alliance was planning a comprehensive, multidisciplinary meeting to educate health care professionals about the recognition and diagnosis of all the categories of chemical and biological threats that terrorists have prepared as weapons against human life.

On December 8, 2001, the Medical Preparedness Alliance hosted the Baltimore-Washington area's first live, comprehensive, all-day multidisciplinary symposium, "Medical Preparedness for Biological and Chemical Atrocities." The program was intense but well-received by doctors, nurses and health care providers. Participants from as far away as Ohio joined the effort to become more knowledgeable about the medical management of anthrax, nerve agents, smallpox, hemorrhagic viruses, vesicants, cyanide and other toxic agents. There were expert speakers from the United States Army Medical Research Institute of Chemical Defense, the United States Army Medical Research Insti-
tute of Infectious Disease, Johns Hopkins Medical Institutions and Walter Reed Army Medical Center.

Anesthesiologists and intensivists are often accused of taking a back seat in addressing medical issues relevant to the medical community at large. In the event of any large-scale biological or chemical attack, both anesthesiologists and intensivists can expect to be directly involved in the operative and critical care of patients who have been exposed to agents that may be deadly to both the patient and the practitioner. Therefore the anesthesiology and critical care communities should take a leadership position to educate the medical community about how to be medically prepared for potential biological and chemical attacks.

It is our ethical duty to prepare for these proven risks well ahead of time, not just after the media has sensitized our patients to ask us questions. It is my hope that the Medical Preparedness Alliance and other regional chapters of ASA and SCCM also will form collaborative partnerships designed toward educating health care providers about the safest and most efficient ways to recognize and manage civilian casualties of biological and chemical weapons.

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6. The letters of Sir Jeffery Amherst were microfilmed and preserved by the Library of Congress as part of a project to preserve English documents at risk during World War II. The story of Amherst and smallpox, along with links to the documents may be found at <http://www.nativeweb.org/pages/lega/amherst/jeff_amherst_lord_jeff .html>. Accessed on January 25, 2002.


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