Bioterrorism Agent Fact Sheet

Botulism/*Botulinum toxin*

Disease

Botulism is a rare disease caused by the botulinum neurotoxin, the most potent toxin known to man, which is produced by the anaerobic sporulating bacterium *Clostridium botulinum*. Although the toxin can enter the body through several mechanisms, the same neurological syndrome develops. The forms of botulism are classified by their mode of exposure. Case fatality rates for all forms depend on the availability of intensive supportive care and are generally ~10%.

Inhalational: Does not occur naturally, but would be the most likely form seen in a large-scale bioterrorist attack via an aerosol release of botulinum toxin.

Food-borne: Most common form of the disease worldwide, resulting from ingestion of improperly prepared foods contaminated with *C. botulinum* that then produce the toxin. Could be the route used for a smaller scale bioterrorism attack via addition of botulinum toxin to a food supply. The toxin is not stable enough to survive long periods in a large volume of food or water, making a large-scale food-borne at tack unlikely.

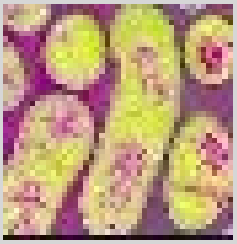
Wound: Rare form of the disease. Results from introduction of *C. botulinum* into a wound from skin abscesses or traumatized tissue.

Infant: Primarily occurs in infants as a result of intestinal colonization of *C. botulinum* following ingestion of spores and subsequent toxin production.

Diagnosis

A single case of known or suspected botulism constitutes a public health emergency and should be immediately investigated as a potential foodborne outbreak or bioterrorism event. A presumptive diagnosis should be made based on presenting signs and symptoms. The diagnosis can be confirmed by a reference laboratory with a mouse bioassay that detects the toxin in serum or stool. All specimens should be refrigerated during storage, serum samples should be obtained before initiation of treatment with antitoxins, and the lab should be notified if the patient has taken anticholinesterase medications.

The differential diagnosis primarily includes Guillain-Barré syndrome and myasthenia gravis. These can be ruled out by physical exam, electromyography (EMG) and response to anticholinesterases.



Botulism

Clinical Features of Botulism

The incubation period varies between the types of botulism and the dose. Large exposures, particularly via the aerosol route, are likely to cause symptoms within 36 hours.

Botulism toxin causes muscle paralysis by irreversibly binding to pre-synaptic motor nerve terminals and blocking the release of acetylcholine.

Early symptoms reflect cranial nerve involvement and include diplopia, blurred vision, dyphagia, dysphasia and dry mouth. As the disease progresses, symmetrical descending muscle weakness and paralysis leads to loss of diaphragmatic function and respiratory failure followed by generalized paralysis. Sensation and mental status remain intact. The triad of symmetric descending flaccid paralysis, lack of fever and clear sensorium should generate a high suspicion for botulism. Recovery occurs over weeks to months as motor neurons slowly regenerate. The severity of disease depends on the dose of toxin exposure and how long of a delay occurs prior to antitoxin therapy.

Treatment

Rapid diagnosis and initiation of treatment and supportive care provide the best opportunity for survival. Treatment should be initiated as soon as the diagnosis is suspected and not delayed for lab confirmation. Botulinum antitoxin, available from the CDC, should be administered to all patients with known or suspected disease. Antitoxin will halt further progression of disease but cannot reverse paralysis that is already present. Because the antitoxin is derived from horse serum, serious complications (including anaphylaxis and serum sickness) may develop. Supportive care generally includes mechanical ventilation and aggressive hygiene measures to prevent nosocomial infections.

Recommendations for safe and effective administration of antitoxin have changed over time; package insert materials should be reviewed before initiation.

Aminoglycosides and clindamycin should not be given as they may worsen paralysis.

Post-Exposure Prophylaxis

Because of limited supplies and common hypersensitivity adverse reactions, post-exposure antitoxin use is not recommended for asymptomatic patients, but it should be administered immediately for those who develop symptoms.

Vaccination

There is currently no vaccine available for the general public. Laboratory employees who work with the toxin or botulism organisms and military employees that are at risk for exposure may be eligible to receive a pentavalent toxoid vaccination through the CDC.

Decontamination

C. botulinum is a hardy spore that is highly heat-resistant, but botulinum toxin in food is easily destroyed through the normal cooking process (heating ≥85º C for 5 minutes). Weather conditions and size of the aerosolized particles determine how long the toxin could remain airborne, but it is estimated that the majority of the toxin would be inactive within 2 days of release. Following a known exposure, patients and their clothing should be washed with soap and water. Surfaces exposed to the initial release should be cleaned with a 1:10 hypochlorite (bleach) solution.

Additional information and references available at www.bioterrorism.slu.edu

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Infection Control

Botulism is not an infectious disease, but rather an intoxication. Person-to-person transmission does not occur. Only Standard Precautions are necessary.

Reporting

Report known or suspected cases or suspected intentional release of botulism immediately to your local health department and hospital epidemiologist. The local health department is responsible for notifying the state health department, FBI, and local law enforcement. The state health department will notify the CDC.

Disclaimer

Information contained in this fact sheet was current as of November 2002, and was designed for educational purposes only. Medication information should always be researched and verified before initiation of patient treatment.

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