

Anthrax - Clinical Signs and Diagnosis

Anthrax, a disease of mammals, including humans, is caused by a spore-forming bacterium called *Bacillus anthracis*. This is one of three information sheets on anthrax. The other information sheets include a general overview and discussions of safety aspects in dealing with anthrax.

Clinical Signs

Disease occurs when spores enter the body, germinate, multiply, and release toxins. The incubation period of natural infection in animals is typically 3 to 7 days with a range of 1 to 14 or more days. Anthrax occurs in several forms, largely defined by the length of the clinical course of disease. In cattle and sheep, the peracute course of illness may last only 1 to 2 hours. The very first indication of problems may be sudden death of the animal. Clinical signs, such as fever up to 107 degrees Fahrenheit, muscle tremors, respiratory distress, and convulsions, often go unnoticed. After death, there may be bloody discharges from the natural openings of the body, rapid bloating, a lack of rigor mortis, and the blood does not clot. This failure of blood to clot is due to a toxin released by *B. anthracis*. The acute form of anthrax in ruminants may have a course of 24 to 48 hours. Affected animals have a high fever, complete anorexia, diarrhea, severe depression, and listlessness. There may be local edema of the tongue with accumulation of edematous fluid in the throat, sternum, perineum, or flanks. Pregnant cows may abort. Milk production may drop severely and what milk there is may be yellow or blood stained.

In horses and related animals, the acute course of illness is more common and can last up to 96 hours. Clinical manifestations depend upon the route of infection. If anthrax spores were ingested, septicemia, fever, colic, and enteritis are usually prominent. Anthrax due to introduction by insect bite (mechanical transmission) is characterized by localized hot, painful, edematous, and subcutaneous swellings at the bite location that spread to the throat, lower neck, ventral thorax, abdomen, prepuce, and mammary glands. Infected horses may have a high fever and dyspnea due to swelling of the throat or colic due to intestinal involvement.

In swine, dogs, and cats, the sub-acute or chronic course of illness is the most common. The route of infection is usually ingestion of contaminated meat or other food. Clinical manifestations often include a

characteristic swelling of the neck secondary to regional lymph node involvement, which causes dysphagia and dyspnea. An intestinal form, with severe enteritis sometimes occurs in these species. Many carnivores apparently have a natural resistance, and recovery is not uncommon.

Diagnosis

Sudden death in an animal without prior signs should lead to a suspicion of anthrax. If anthrax is suspected as the cause of death, the carcass should **NOT** be opened because exposure of the vegetative anthrax bacteria in body fluids to oxygen induces spore formation. The spores will contaminate the environment and present a health risk to personnel and other nearby animals. In the unopened carcass, the putrefactive processes destroy the bacilli. Diagnosis can be confirmed by collecting a post-mortem blood sample aseptically from a peripheral vein (e.g., the jugular vein) and examining a blood smear for the presence of the bacillus capsule using McFadyean's polychrome methylene blue stain or by culturing the bacilli. When a postmortem blood sample cannot be obtained from a peripheral vein, blood can be obtained from a small incision in the ear using a cotton swab. The swab should be allowed to air dry before shipping in order to encourage sporulation and kill other bacteria. *B. anthracis* competes poorly with putrefactive bacteria and may not be seen in smears after 2 or 3 days; culture is then necessary for confirmation of diagnosis but growth is increasingly unlikely in blood held for more than 3 days. Potential culture specimens can also be obtained from hemorrhagic nasal, buccal, or anal exudates or from materials contaminated with the exudates.

For More Information

For more information, contact
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Riverdale, MD 20737-1231
Telephone (301) 734-8073
Fax (301) 734-7817
or visit our Web site at www.aphis.usda.gov/vs/

For Public Health Information

For more information on anthrax regarding public health, contact
Centers for Disease Control and Prevention
1600 Clifton Road
Atlanta, GA 30333
Telephone (404) 639-3311
or visit their Web site at www.cdc.gov/

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