Anthrax: What Every Coder Should Know

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The inhalation anthrax identified by a Florida physician in October 2001, during the recent series of bioterrorist attacks, was the first case of reported inhalation anthrax in the United States in more than 25 years.[1] With the threat of anthrax as a biological weapon, correct coding could be critical to aid in epidemiologic investigations and studies. This article will describe the clinical aspects of anthrax including symptoms, diagnosis, and treatment. Coding scenarios with discussion of the applicable ICD-9-CM diagnosis codes are also included to provide practical application for preparation in the unlikely event that anthrax appears in your area.

Anthrax is an infectious disease caused by a gram-positive spore-forming bacterial organism, namely *Bacillus anthracis*. In a natural occurrence, the disease is transmitted to people by contact with infected animals or their products. Historically, wool sorters at industrial mills were at highest risk. As a result, inhalation anthrax was dubbed "wool-sorters' disease." Because of improvements in animal vaccination and infection controls, naturally occurring anthrax is very rare today. Only 18 cases of inhalation anthrax were reported in the United States from 1900 to 1978.[2]

There are three types of anthrax: cutaneous anthrax, inhalation anthrax, and gastrointestinal anthrax. A person may become infected when *B. anthracis* spores enter through the skin, are inhaled, or are consumed by eating contaminated, undercooked meat. This disease cannot be transmitted between people.

Cutaneous Anthrax

Cutaneous anthrax occurs following the deposition of the organism into the skin. Areas with previous cuts or abrasions are especially susceptible to infection. The infection typically occurs on exposed areas of the hands, arms, or face. Differential diagnoses for cutaneous anthrax may include spider bites, insect bites, eczema gangrenosum, ulcerative glandular tularemia, plague, and staphylococcal and streptococcal cellulitis.

This type of anthrax begins as a painless, pruritic, red-brown papule that subsequently enlarges and develops surrounding erythema and edema. Within four to 10 days, the area becomes ulcerated and blackened. Without antibiotic treatment, the infection will spread to other systems and may cause lymphangitis and painful lymphadenopathy. Early antibiotic treatment of cutaneous anthrax is usually curative. Antibiotic treatment generally prevents progression to systemic disease, although it does not prevent the formation of the ulcerative lesions. Topical therapy for these lesions has not proven useful.

Coding Scenario 1

The patient initially presented to the ER with a complaint of a "spider bite" from two to three days ago that seemed to be infected. Admitting diagnosis was cellulitis of the left forearm. A clear serosanguineous discharge was collected from the wound, and numerous organisms were noted on gram staining. Subsequent culture results were positive for B. anthracis. *Antibiotic therapy had been initiated on the day of admission; this was changed to ciprofloxacin, and the patient was closely monitored for systemic manifestations.*

The state health department was notified, and they promptly contacted the Centers for Disease Control (CDC). CDC clinical protocols were immediately instituted. On day two of the hospitalization, the affected area had ulcerated, and 1 to 3 mm vesicles appeared. The wound developed a painless, depressed black eschar with extensive local edema by day five. At the time of discharge, the patient had exhibited no evidence of systemic disease. Final diagnosis was cutaneous anthrax.

The patient was discharged on ciprofloxacin, 500 mg twice a day by mouth, for an additional 54 days. The importance of continuing antibiotic therapy was emphasized. The patient was instructed to return to the hospital immediately with any systemic symptoms and to follow up in the clinic in a few days.

Coding scenario 1 is a confirmed case of cutaneous anthrax, ICD-9-CM code 022.0. Both spider bite and cellulitis were mentioned early in the hospitalization, but both were ruled out and would not be coded. Ulceration and edema are also mentioned, but these are an integral part of the anthrax infection and would not be reported separately. This patient did not develop any systemic complications; however, it would be appropriate to separately report serious systemic complications. Manifestations such as lymphangitis complicating cutaneous anthrax or meningitis complicating inhalation anthrax should be listed as additional codes.

Currently there are no E codes for bioterrorism. An E code to reflect exposure to anthrax as an assault may be reported (E968.8, Assault by other specified means). Code E997.1, Injury due to war operations by nuclear weapons, biological warfare, is reserved for acts that take place as part of a declared war—that is, military action.

Inhalation Anthrax

Inhalation, or pulmonary, anthrax may be contracted by inhaling airborne *B. anthracis* spores. The incubation period varies widely. It is typically two to three days, but spores may remain dormant for several days or weeks. Inhalation anthrax cases have been documented as late as 43 and 58 days after exposure. Differential diagnoses for inhalation anthrax may include a variety of pneumonias, *Mycoplasma, Legionella*, psittacosis, tularemia, and histoplasmosis.

Initial symptoms resemble the common cold or influenza and may include myalgia, fatigue, fever, nonproductive cough, and chest discomfort. These symptoms may last for two to three days and are followed abruptly by respiratory distress, dyspnea, and hypoxia. The fever increases, and the patient develops severe respiratory failure, followed by cyanosis, shock, and coma. The patient may also develop pulmonary edema and pleural effusion. The patient's chest x-ray may show diffuse patchy infiltration, a widened mediastinum, and thoracic edema. Meningitis occurs in 50 percent of patients.[3] The term "anthrax pneumonia" is misleading; typical bronchopneumonia does not occur.

Gastrointestinal Anthrax

Gastrointestinal anthrax may occur following the consumption of food contaminated by *B. anthracis* spores. It is characterized by an acute inflammation of the intestinal tract. Early symptoms include nausea, vomiting, anorexia, and fever that progress rapidly to bloody diarrhea, bowel necrosis, septicemia, and death. Hemorrhagic necrosis often extends to the mesenteric lymph nodes. Massive ascites has occurred in some cases. Early diagnosis is very difficult; consequently, mortality is extremely high.

Diagnosing Anthrax

Recognition of clinical symptoms is a key to early diagnosis. Occupational history and exposure history are important. The tests that serve as early confirmatory evidence of anthrax include gram staining of affected tissues or sites and culture or biopsy of affected sites.

The *B. anthracis* organism grows extremely well in traditional culture media available in all clinical laboratories. However, it is quite a challenge to distinguish many of the other Bacillus species from *B. anthracis*. If the sample is large and the concentration of bacteria is high, the initial screening test can produce positive results within two hours.

The confirmation test takes much longer, depending in part on how fast the bacteria grow, but results are usually available within 24 to 36 hours after a proper sample is received in the laboratory.

Treatment

Early antibiotic treatment is essential. A delay of even a few hours may lessen the chance for survival, particularly in inhalation anthrax. For this reason, initial treatment should be begun based on clinical suspicion even before definitive test results are available. Individuals who have been in a contaminated area may be treated with postexposure prophylaxis (PEP). This entails providing a few days of antibiotic treatment with observation and further testing to determine if a full course of antibiotics is necessary. Ciprofloxacin and doxycycline are FDA approved for PEP, and ciprofloxacin, doxycycline, and amoxicillin are FDA approved for treatment of anthrax.[4]

Coding Scenario 2

A postal worker presented to the ER requesting testing to determine if he had anthrax after learning that a coworker was suspected to have contracted the infection. The patient had no signs or symptoms of infection. Diagnostic testing was done, and initial results were negative. However, because of the confirmed exposure PEP was initiated with ciprofloxacin, 500 mg twice a day by mouth, for 60 days. The patient was instructed to return immediately if he noted any flu- or cold-like symptoms, call the next day for confirmatory test results, and follow up with his primary care physician. The state health department and CDC were notified.

In coding scenario 2, the patient had a confirmed exposure to anthrax without manifestation of the infection. A code from category V01, Contact with or exposure to communicable diseases, is the most applicable category to reflect this exposure. At the present time, category V01 does not include a specific code for anthrax. Code V01.8, Contact with or exposure to other communicable disease, would be reported. Code V07.39, Other prophylactic chemotherapy, should be assigned as an additional code to report that the patient was placed on prophylactic antibiotic therapy. This code description may be misleading at first glance. However, the alphabetic index clearly directs the coder to code V07.39 for prophylactic antibiotics.

In this case, the test results were negative. If the diagnostic test results were positive, the abnormal finding should be reported (code 795.3, Nonspecific positive culture findings). The code for anthrax, from category 022, is not assigned based on culture results alone. This code is used only when the patient is confirmed to have the disease. As in coding scenario 1, an E code to reflect the exposure to anthrax as an assault may be reported (E968.8, Assault by other specified means).

Coding Scenario 3

The patient presented to the clinic claiming that she was exposed to "white powder." The patient exhibited no symptoms, and upon further questioning could not substantiate this "exposure." No tests were performed. The patient was reassured and advised as to what constitutes an exposure to anthrax. The assessment was anthrax anxiety.

Clarification is needed from the physician for correct code assignment in coding scenario 3. The coder would need to know if there was actually an exposure to anthrax and if the patient was truly experiencing anxiety or was merely worried. If there was an exposure, code V01.8, Contact with or exposure to other communicable disease, would apply, but the physician would undoubtedly have performed a screening test and most likely initiated PEP.

If there was no exposure and the patient was merely worried, code V65.5, Person with feared complaint in whom no diagnosis is made, may apply. If there were any documented symptoms, or if the physician confirms that the patient was experiencing anxiety, the codes for these symptoms or the anxiety may apply.

Implications

A clinical understanding of anthrax will facilitate correct coding. For example, recognizing that anthrax is a bacterial organism, which symptoms are integral to the infection, and what manifestations represent serious complications that should be separately reported are all helpful in selecting accurate ICD-9-CM diagnosis codes. Following official coding guidelines, as always, is also a key to accurate coding and reporting of anthrax. As the outpatient case scenarios demonstrate, the circumstances surrounding the reason for the encounter are especially important.

There is some speculation that more Americans will visit physicians this flu season because anthrax symptoms can be similar to the flu. If this is true, an understanding of the ICD-9-CM codes applicable to suspected anthrax may be critical for all coders. u

Notes

1. "Anthrax, What Every Clinician Should Know." CDC Webcast, Oct. 18, 2001. Available at www.sph.unc.edu/about/webcasts/bioter_10-18_stream1.htm.
2. Inglesby, Thomas V. et al. "Anthrax as a Biological Weapon." *Journal of the American Medical Association* 281, no. 18 (1999): 1735-1745.
3. "CDC FAQs About Anthrax." Available at the Centers for Disease Control Web site at www.bt.cdc.gov/documentsApp/ faqanthrax.asp.
4. Ibid.

References

Beers, Mark H., and Robert Berkow (eds). “Bacterial Diseases.” In *The Merck Manual of Diagnosis and Therapy*, 17th edition. Whitehouse Station, NJ: Merck Research Laboratories, 1999, pp. 1157-1158.

CMS memorandum to all Medicare contractors dated Oct. 26, 2001. “Medicare Coverage and Coding for Services Related to Anthrax.” A copy of this memo is posted on the SCC Coding Community of Practice as a community resources. Go to www.ahima.org and click “Communities of Practice.”

National Center for Infectious Diseases; Epidemiology Program Office; Public Health Practice Program Office; Office of the Director, CDC. “Recognition of Illness Associated with the Intentional Release of a Biologic Agent.” *Morbidity and Mortality Weekly Report* 50, no. 41 (Oct. 19, 2001): 893-897.

Official ICD-9-CM Guidelines for Coding and Reporting are available at www.cdc.gov/nchs/data/icdguide.pdf. Also available in the Society for Clinical Coding Hospital Inpatient Community of Practice under “Neighborhood Links.”

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Article citation:
Stanfill, Mary H. "Anthrax: What Every Coder Should Know." *Journal of AHIMA*, no.1 (2002): 70-73.