Anthrax Disease

Traveler Summary

Key Points

- Anthrax is a bacterial infection occurring worldwide, acquired through direct contact with infected animals or animal products, consumption of contaminated meat, or inhalation of airborne anthrax bacterial spores.
- Risk is very low for travelers.
- Symptoms of anthrax differ based on the mode of transmission and include itching and skin lesions covered by blackened dead tissue, nausea, vomiting, fever, and influenza-like illness.
- Consequences of infection can include respiratory failure, shock, infection of the blood and internal organs, inflammation of the brain membranes, and death.
- Prevention includes avoiding risk behaviors, such as contact with infected livestock or animal products and consumption of contaminated meat.
- Anthrax vaccine is not routinely recommended for travelers unless otherwise indicated for occupational reasons. A preexposure vaccination series is 3 doses given over 6 months.
- Vaccine side effects are most commonly injection-site reactions, tiredness, headache, and muscle aches.
- Duration of vaccine protection declines over time after completing the series. A booster may be required annually or every 3 years (depending on risk) to maintain immunity.
- Postexposure prevention includes a vaccination series consisting of 3 doses given over 4 weeks, combined with antibiotic use.

Introduction

Anthrax is an infectious bacterial disease occurring worldwide that presents as cutaneous (most common), gastrointestinal, or inhalation anthrax depending on the route of transmission (skin contact, consumption, or inhalation). Domestic and wild animals may become infected when they inhale or ingest spores in contaminated soil, plants, or water, and the illness may be transmitted to humans upon contact with such infected animals or animal products. Risk is very low in travelers unless a bioterrorism event occurs. Anthrax disease can be prevented with vaccine, antibiotic, and antibody-based treatments given either before or after an exposure.

Risk Areas

Anthrax occurs globally, but most commonly in impoverished agricultural regions with inadequate control programs for anthrax in livestock (e.g., herbivore mammals such as cattle, sheep, goats, camels, pigs, and antelope) in sub-Saharan Africa; sparsely populated areas in western regions of the US; central and southwestern Asia; the Caribbean; Central and South America; northern, southern, and eastern Europe; and parts of the Middle East. Occurrence of anthrax is uncommon in industrialized countries.

Worldwide, 2,000 to 20,000 human cases occur annually. In recent years, large-scale animal outbreaks occurred in reindeer in Russia (2016) and in bison in Canada (2012).

Transmission

Anthrax is transmitted via 3 major routes: skin, digestive tract, and lungs.

Skin infection (cutaneous anthrax) can result from direct contact with infected animals, animal products (e.g., meat, wool, or hides), or items made with such products (e.g., drum-heads or wool clothing). This usually occurs in agricultural settings (e.g., ranches, slaughterhouses, veterinary clinics, butcher shops) or industrial settings (e.g., tannery/leather, wool, or hide processing factories). Cuts or abrasions on the skin increase susceptibility to infection; person-to-person transmission is rare.

Digestive tract infection (gastrointestinal anthrax), which is quite rare, may result from consumption of undercooked meat obtained from infected animals and tends to occur in family clusters or single-source outbreaks. The bacterium affects the upper (throat and esophagus) or lower (stomach and intestines) gastrointestinal tract.

Lung infection (inhalation anthrax) results from inhalation of anthrax bacteria spores and is almost exclusively associated with intentional transmission through bioterrorism or biowarfare. It may also occur when anthrax spores are aerosolized while working with contaminated animal products such as wool, hair, or hides.

Injection anthrax is a new and rare form of anthrax only reported in northern Europe and transmitted by the injection of anthrax-contaminated heroin by injection-drug users.

Risk Factors

Risk is very low for most travelers but increases for persons consuming contaminated meat or handling contaminated animal hide, wool, or other animal products, and for heroin users, laboratory workers (in facilities producing large amounts of the bacteria), populations typically targeted by terrorists, military personnel deployed to designated high-risk areas, or emergency response personnel after an intentional release of anthrax spores.

Symptoms

Symptoms of anthrax most commonly appear within 7 days of exposure and may vary, depending on the mode of transmission.

Cutaneous anthrax begins with itching, followed by a painless skin lesion (usually appearing on the face, neck, or arms) that changes from a bump to a blister then to an ulcer covered with blackened dead tissue (the hallmark sign of cutaneous anthrax). Fever, extreme tiredness, headache, and swollen glands may also occur.

Gastrointestinal anthrax affects all regions of the digestive tract (from the mouth to the large intestine) and is characterized by headache, nausea, vomiting, fever, difficulty swallowing, and abdominal pain and tenderness.

Inhalation anthrax begins like a viral respiratory illness, followed by shortness of breath, mild fever, and muscle aches. Breathing becomes more difficult within 2 to 3 days, and low blood pressure occurs.

Anthrax in injection-drug users (injection anthrax) usually develops 2 to 10 days after exposure and commonly occurs as injection-site pain, itching, blisters, swelling, and excessive bruising.

Consequences of Infection

Inhalation anthrax may result in shock and inflammation of the membranes around the brain; death occurs in 47% to 92% of cases depending on treatment. Rarely, gastrointestinal anthrax may spread and cause generalized infection of the blood and internal organs, ulcers, altered mental status, and shock; death occurs in 25% to 60% of cases, with death occurring within 2 to 5 days of onset. With treatment, the death rates decline slightly to less than 40%. Injection anthrax can spread throughout the body faster and may be harder to recognize than skin anthrax; death occurs in more than 25% of cases.

Need for Medical Assistance

Persons who have been exposed to anthrax or develop symptoms after travel (e.g., unexplained fever or new skin lesions) and persons with respiratory symptoms after exposure to an unknown white powdery substance should seek immediate medical attention for evaluation of the need for postexposure treatment. Animal-hide drum owners or players should report any unexplained fever or new skin lesions to their health care provider and describe any recent contact with animal-hide drums.

Vaccine, antibiotics, antibodies, or immune globulin must be started as soon as possible following exposure and may reduce the duration and severity of illness.

Prevention

Nonvaccine

During trips to countries where anthrax is common and vaccine coverage of livestock is low, avoid:

- Direct or indirect contact with livestock, animal products, and animal carcasses
- Consumption of meat from animals of uncertain origin
- Consumption of raw or undercooked meat
- Returning home with animal products, trophies, or souvenirs that are prohibited by US CDC, US Department of Agriculture (USDA), or home/destination country's authorities.

Vaccine

Preexposure vaccination is not indicated for travelers without other reasons for vaccination (e.g., military personnel or occupational exposure). Postexposure vaccination is recommended for unvaccinated persons who may have inhaled anthrax spores.

Side Effects

The most common side effects of anthrax vaccine include injection-site reactions (e.g., tenderness, pain, redness, swelling, and arm motion limitation), headache, muscle aches, and fatigue.

Persons with underlying medical conditions or who have concerns about the vaccine should speak to their health care provider before vaccine administration.

Timing

The preexposure vaccination series consists of a primary series of 3 doses given at 0, 1, and 6 months. Booster doses are as follows:

- For persons at high risk of exposure: 2 booster doses should be given, 1 each at 6 and 12 months after completion of the primary series. Subsequent follow-up boosters may be given every 12 months if risk continues.
- For persons not currently at high risk of exposure but who may have future high risk of exposure: 2 booster doses should be given, 1 each at 6 and 12 months after completion of the primary series. Subsequent follow-up boosters may be given every 3 years if risk continues.
- If persons vaccinated with a completed primary series need to immediately enter a high-risk area and 6 or more months have elapsed since the last dose of vaccine, an out-the-door booster and 2 weeks of antimicrobials should be given.

The postexposure series for unvaccinated persons consists of 3 vaccine doses (given at 0, 2, and 4 weeks) plus concurrent antibiotic therapy for at least 42 days after the first dose or 14 days after the last dose of the vaccine series, whichever comes last. Antibody therapy may be indicated in some circumstances.

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