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Bioterrorism Agent Fact Sheet

Glanders/*Burkholderia mallei*

Disease

Glanders is a primarily equine disease caused by the gram-negative bacillus *Burkholderia mallei*. Most cases occur in horses, mules or donkeys. Rarely, humans may become infected after handling infected animals; typically this occurs in Asia, the Middle East or South America, in veterinarians, slaughterhouse workers or others that work with animals.

Other than laboratory employees who contracted the disease at work, there have been no naturally acquired cases of human glanders in the US in over 61 years.

Glanders was believed to have been used during WWI to infect horses and mules that carried supplies, and during WWII on horses, civilians and prisoners of war. Human cases that present in the absence of animal cases or during an epidemic should raise suspicion of a biological attack.

Diagnosis

Serology testing can assist in diagnosis confirmation, but a negative serology does not exclude the diagnosis; serology and DNA-based assays are not FDA approved or standardized. Blood cultures are generally not useful, as they tend to remain negative until the patient is near death.

Presumptive diagnosis:

- Staining of lesion or abscess specimens: Gram-negative coccobacillus and bipolar-staining (“safety pin”) with Methylene blue or Wright stains (Use of glucose, glycerol or meat agar may facilitate lab growth)

Confirmatory diagnosis:

- Agglutination tests require 7-10 days for confirmation; a high background titer in normal sera (1:320 to 1:640) makes it difficult to interpret
- Complement fixation tests should be utilized; a titer \geq 1:20 is considered positive

Treatment

Mortality is almost 100% in untreated patients; proper antibiotic therapy can decrease morbidity and mortality. Extent of treatment depends on severity of illness, varying from oral therapy for 60-150 days (localized disease) to parenteral therapy for prolonged periods (systemic illness). There is little data available on human studies of glanders; therefore strain resistance should be established and therapy adjusted as necessary.

Until sensitivities are known, treat as follows:

- **Localized disease** (treat for 60-150 days):
Amoxicillin/clavulanate 60 mg/kg/day PO in three divided doses or
Tetracycline 40 mg/kg/day PO in three divided doses or
TMP/SMX (TMP 4 mg/kg/day; sulfa 20 mg/kg/day) PO in two divided doses

Glanders

Clinical Features of Glanders

Incubation period 1-14 days. Glanders may present as either an acute or chronic illness. In the event of a bioterrorism event, acute illness is most likely to occur. The acute form of glanders can present as either a localized disease, such as a pulmonary infection, or in a fulminant septic form. The most commonly seen symptoms include high fever, mucositis, and multiorgan abscesses, predominantly in the lungs, liver and spleen.

Acute Septicemia: Acute onset of fever (often > 102 F), rigors, headache, muscle pain, night sweats, pleuritic chest pain, jaundice, sensitivity to light, and diarrhea. The skin has a generalized redness (erythroderma) often accompanied by necrotizing lesions. Leukopenia or a mild shift to the left may occur. Cervical adenopathy, tachycardia, and mild hepatomegaly or splenomegaly may be present.

Acute localized disease (pulmonary or mucous membrane):

Pulmonary: Develops after inhalation of particles or through hematogenous spread. Symptoms of septicemia arise (see Septicemic form above) in conjunction with a positive CXR for 0.5-1cm miliary lesions and/or bilateral upper lobe infiltrates with or without consolidation or cavitation.

Mucous membrane: Form resulting in highest mortality. Disease begins as nasal ulcers and nodules that secrete bloody discharge and often leads to sepsis. As the systemic infection develops, a papular and/or pustular rash that is similar in appearance to smallpox may appear. Liver or spleen abscesses and pulmonary lesions may also be present. Most patients rapidly progress to septic shock.

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- **Systemic disease** (treat parenterally for 2 wks then switch to oral therapy for 6 months):
Ceftazidime 120 mg/kg/day IV in three divided doses and
TMP/SMX (TMP 8 mg/kg/day; sulfa 50 mg/kg/day) IV in four divided doses

Other effective therapies: Doxycycline, rifampin and ciprofloxacin.

Post-Exposure Prophylaxis

There is currently no known effective pre or post-exposure prophylaxis available, although post-exposure prophylaxis may be attempted using TMP/SMX.

Vaccination

There is no vaccine available for human use.

Chronic disease (farcy): Characterized by flare-ups and remissions over the course of years. The most common symptom is cutaneous and intramuscular abscesses on the limbs resulting from regional lymphadenopathy. Some cases have developed osteomyelitis, brain abscesses or meningitis, yet some patients may be completely asymptomatic. Patients present with history and symptoms similar to TB or syphilis.

Infection Control

Transmission to humans occurs through inhalation of particles or from direct contact between non-intact skin or mucous membranes and infected animal tissue. Following a bioterrorism event during which inhalational acquisition is most likely, person-to-person transmission is very unlikely.

For most patients, only Standard Precautions are necessary. If the patient has skin lesions, Contact Precautions (gown and gloves for all patient encounters) are needed.

Aerosolization is likely in the lab setting; biosafety level 3 precautions are necessary for handling of specimens.

Decontamination

Standard hospital-approved disinfectants are adequate for cleaning patient rooms.

Reporting

Report suspected cases or suspected intentional release of glanders to your local health department. 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 August 2001, and was designed for educational purposes only. Medication information should always be researched and verified before initiation of patient treatment.

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