

Brucellosis Information for Professionals

Agent: Brucella species are gram-negative cocco-bacillary organisms, of which four are pathogenic in humans (*Brucella melitensis*, *B. abortus*, *B. canis* and *B. suis*). They are highly infectious, especially *B. melitensis* and *B. suis*. Food may serve as a vehicle for transmission. Most infections are the result of low dose exposure and therefore asymptomatic under natural conditions, however, a large aerosol dose may increase the clinical attack rate. Attack with these organisms would probably have low mortality, and therefore be used as incapacitating agents.

Reporting Requirements for Disease: Report any suspect cases of brucellosis to your local health authority at within one working day; or, call the Department of State Health Services at 1-800-252-8239. Case clusters or multiple cases should be reported immediately.

Infection Control: Health care workers should exercise Standard Precautions. Person-to-person transmission has been noted but is insignificant. Decontamination can be accomplished with any hospital grade disinfectant. Proper treatment of water, through boiling, chlorination or iodination would also be important in areas intentionally subjected to *Brucella* aerosols.

Incubation Period: 3-60 days (respiratory brucellosis has a shorter incubation period than foodborne brucellosis)

Signs/Symptoms: Brucellosis presents as a nonspecific febrile illness with a

long and variable incubation period in about 50% of patients and as an acute systemic febrile illness in the remainder. Symptoms of patients infected by aerosol mimic those infected by other routes. Characteristic "undulant" fever, headache, chills, myalgias, arthralgias, weakness and malaise are the most common complaints.

Psychiatric symptoms such as depression and irritability and gastrointestinal symptoms such as constipation, anorexia, nausea, and diarrhea may also occur. Respiratory symptoms may occur in as many as a quarter of patients with brucellosis. One or both sacroiliac joints may become infected causing low back and buttock pain that is intensified by stressing the sacroiliac joints on physical exam. Peripheral joint involvement may occur and vary from pain on range of motion testing to joint immobility and effusion. Hepatomegaly or splenomegaly may occur in up to 45-63% of cases. Lymphadenopathy may be noted. Meningitis occurs occasionally (<5% of cases). Symptoms may persist from 3-6 months and sometimes for over a year.

Diagnosis: Differential Diagnosis: A very broad differential diagnosis is necessary due to the nonspecific symptoms and includes bacterial, viral, and mycoplasmal infections. The symptoms of viral and mycoplasmal infections are usually only present for a few days, while in brucellosis they persist for long periods. Other causes of persistent fever and constitutional symptoms should be included in the differential: these include collagen-vascular diseases, neoplasms,

and drug reactions as well as specific infectious agents such as tuberculosis, typhoidal tularemia, typhoid fever, and relapsing fever and agents associated with abscesses, osteomyelitis, and endocarditis. Blood and/or bone marrow cultures may need to be maintained ≥ 30 days to identify brucellae. In patients with acute bronchopneumonia, *Streptococcus pneumoniae*, *Streptococcus pyogenes*, and *Yersinia pestis* should be included in the differential.

Diagnostic tests: A serum agglutination test (SAT) is available to detect both IgM and IgG antibodies; a titer of 1:160 or greater is indicative of active disease, although cross-reaction to *Francisella tularensis* may occur. ELISA and PCR on blood samples are rapid tests at any stage of disease. Nasal swabs, sputum, and respiratory secretions may also be positive by PCR in the first 24 hours after exposure. Isolation of the organism is difficult, but possible from blood (15-70% pos.) collected into either citrated tubes or culture bottles and bone marrow (92% pos.) in a febrile patient.

Specimen Submission: All specimens must be triple contained in an approved shipping container and have biohazard labels. Culture requires special techniques a using BSL3 laboratory and may take up to 6 weeks. The receiving laboratory must be alerted prior to transport by calling (800) 252-8239 ("press 1"). Newly available diagnostic tests may be discussed at that time. Specimens must be accompanied by a Specimen Submission Form (G-1A) and submitted to the Department of State Health Services Laboratory, 1100 West 49th Street, Austin, TX 78756. Brucellosis should be prominently

mentioned on the G-1A form so that appropriate biosafety precautions will be taken in the laboratory.

Additional Tests: Anemia, leukopenia, and thrombocytopenia are common. The chest x-ray may be normal or may reveal bronchopneumonia, interstitial pneumonitis, pleural effusions, enlarged hilar lymph nodes, or single or miliary nodules. Nonpneumonic radiographic findings similar to those in tuberculous infection may also occur, including disk space narrowing and epiphysitis. Paravertebral abscess may be evident on CT scan or MRI. CT scans often show vertebral sclerosis. Leukocyte count, while usually normal, may be low. Technetium or Gallium-67 bone scans are 90% sensitive for detecting sacroiliitis and will also detect other sites of bone and joint involvement.

Treatment: The treatment of choice for brucellosis is doxycycline 100 mg po q 12 hours for 6 weeks and streptomycin 1 gm IM qd for the first 3 weeks. This regimen is particularly indicated for patients with complications such as spondylitis. Doxycycline 100 mg bid po plus rifampin 600 mg qd po for a minimum of six weeks may also be used. In children, serious infections are treated with streptomycin 15 mg/kg intramuscularly twice daily (up to 2 grams/day) or gentamicin 2.5 mg/kg every 8 hours plus ciprofloxacin 15 mg/kg/day or rifampin 20 mg/kg/day in 2 divided doses. Oral trimethoprim/sulfamethoxazole 10 mg/kg/day (of trimethoprim), doxycycline, or tetracycline can be used to treat less serious infections. For central nervous system infections, a third generation cephalosporin plus rifampin is appropriate.