BRUCELLOSIS

Based on the MoH Communicable Diseases Control Manual 2012[1]

Associated Documents

Case report Form:
Y:\CFS\ProtectionTeam\FinalDocs\NotifiableConditions\Brucellosis\FormsStdLettersQuest\Brucellosis_July2013.pdf

Fact sheet:
https://www.health.govt.nz/our-work/diseases-and-conditions/communicable-disease-control-manual/brucellosis

The Illness

Brucellosis a bacterial disease caused by *Brucella* spp is one of the most widespread zoonoses (infects sheep, cattle, goats, pigs and other animals) worldwide. *B. melitensis* (small ruminants), *B. abortus* (cattle), *B. suis* (swine), and *B. canis* (dogs) are known to cause human disease. Human brucellosis due to *B. melitensis* infection is the most common zoonosis worldwide. The only species found in New Zealand, *B. ovis*, is not known to be pathogenic for humans.[2]

All age groups and both sexes are affected. Humans acquire the infection through the consumption of products from infected animals such as unpasteurized milk, cheese and inadequately cooked or raw meat. Infection may also result from the entry of the bacteria from infected animals or their secretions through skin lesions, conjunctiva or from inhalation of contaminated dust or aerosols. Brucellosis has a high morbidity both for humans and animals, but human-to-human transmission is unusual. The prevalence has been increasing in some countries due to growing international tourism and migration.

Brucella organisms can survive for a variable time in the environment depending on the conditions (see Transmission below). *Brucella* bacteria are sensitive to pasteurization.

Major endemic areas include countries of the Mediterranean basin, Persian Gulf, the Indian subcontinent, and parts of Mexico and Central and South America. New foci that have emerged include many of the former Soviet Union Asian Republics, such as Kazakhstan, Kyrgyzstan, and Tajikistan.

In Australia *B. suis* has been observed in approximately 20 percent of feral swine, and infection among hunters has been described. [2]

Epidemiology in New Zealand
The only species found in New Zealand, *B. ovis*, is not known to be pathogenic for humans. One case of brucellosis was notified in New Zealand in 2015 in a male who had recently arrived from Saudi Arabia. Since 1997, 15 cases of brucellosis have been notified. There have been no locally acquired cases of brucellosis in New Zealand since 1996.[3]

Internationally, ingestion of unpasteurised goat cheese and milk are the most common risk factors for brucellosis.

CASE DEFINITION
Clinical description
Frequently asymptomatic. Most commonly it is an acute illness with fever, arthralgia, headache, malaise, anorexia, constipation, respiratory tract symptoms and hepatosplenomegaly. If inadequately treated, especially in older cases and in the form of *Brucella melitensis* infections, persistent suppurative foci of infection in joints, bone, liver or spleen may develop. Other complications include epididymo-orchitis, meningoencephalitis, endocarditis and chronic fatigue syndrome.

Relapse: [2] The rate of relapse following treatment is about 5 to 15 percent. Relapse usually occurs within the first six months following completion of treatment, although it may occur up to 12 months following completion of treatment.

Chronic brucellosis[2]**:** Chronic brucellosis refers to patients with clinical manifestations for more than one year after the diagnosis of brucellosis is established. Chronic brucellosis is characterized by localized infection (generally spondylitis, osteomyelitis, tissue abscesses, or uveitis) and/or relapse in patients with objective evidence of infection (elevated antibody titres and/or recovery of brucellae from blood or tissues).

In some cases, patients attribute symptoms to chronic brucellosis in the absence of objective evidence for infection (low antibody titres, sterile cultures). Such patients typically have a cyclic course with intermittent back pain, arthralgias, sweats, and signs of psychoneurosis.

Incubation: 5–60 days; commonly 1–2 months.

Transmission: The bacteria are excreted in milk and urine and found in the placentas and foetal tissues of infected animals. *Brucella* organisms can survive up to two days in milk at 8°C, in water for up to 2 months, up to three weeks in frozen meat, and up to three months in goat cheese. Brucellae shed in animal excretions may remain viable for >40 days if the soil is damp. The organisms are sensitive to heat, ionizing radiation, most commonly used disinfectants, and pasteurization. [1,2]

Humans may be infected through contact with infective material via cuts or abrasions in the skin, conjunctivae or inhalation, by ingestion of unpasteurised cheese or milk or by accidental needle stick or mucosal splash when vaccinating using live attenuated vaccine. Aerosols may occasionally transmit *Brucella* to laboratory staff. Rare human-to-human transmission through sexual contact has been reported. Rare person-to-person communicability. There may be a risk in endemic areas from animal fomites.

Communicability: Person-to-person communicability is rare. Sexual transmission has been reported.

Susceptibility: Everyone is susceptible. Severity and duration of clinical illness vary. Duration of acquired immunity uncertain. Pregnant women and their babies are at risk of developing severe disease. If left untreated, infection may cause birth defects, spontaneous abortion or foetal death.

Prevention: Educate New Zealand tourists travelling to countries where *Brucella* is endemic of possible risk exposures, particularly the risks of consuming unpasteurized dairy products.

Notification Procedure

- Attending medical practitioners or laboratories must immediately notify the local medical officer of health of suspected cases. Notification should not await confirmation. (Before the case is classified as confirmed consult an infectious diseases physician to discuss the likelihood of the case being brucellosis and possible risk exposures).

CASE CLASSIFICATION

- **Under investigation:** A case that has been notified, but information is not yet available to classify it as probable or confirmed.
- **Probable:** A clinically compatible illness that is epidemiologically linked to a confirmed source.
- **Confirmed:** A clinically compatible illness that is laboratory confirmed.
- **Not a case:** A case that has been investigated and subsequently found not to meet the case definition.

Laboratory Testing

Laboratory confirmation requires at least one of the following:

- isolation of *Brucella* species or detection of *Brucella* nucleic acid from a clinical specimen
- a four-fold or greater rise in *Brucella* antibody titre (by SAT, ELISA, Coombs, IFA) between acute and convalescent phase serum specimens (SAT slide agglutinin test). Consider the possibility of cross-reactivity in the *Brucella* SAT test with antibodies in people infected with *Yersinia enterocolitica*, other yersiniae, cholera, tularaemia or certain serotypes of *Salmonella*, *Escherichia coli* and *Pseudomonas*.

Management of Case

Diagnosis[2]
Laboratory findings should be interpreted together with:
- clinical manifestations,
- exposure history,
- occupation,
- history of past infection.

Investigation
- Obtain a history of travel, animal contact, microbiology laboratory work or consumption of unpasteurised cheese or milk.
- Ensure laboratory confirmation has been attempted. Species-level identification of the organism through isolation or nucleic acid amplification aids investigation of the source.

Restriction
- Cover draining wounds with a dressing.

Treatment
- The case should be under the care of an infectious disease's physician.
- Cases 8 years of age or older should be treated with doxycycline plus either gentamicin or rifampicin.
- For cases younger than 8 years, give co-trimoxazole plus either gentamicin or rifampicin.

Counselling
- Advise the case and their caregivers of the nature of the disease and its mode of transmission. A fact sheet is available: https://www.health.govt.nz/our-work/diseases-and-conditions/communicable-disease-control-manual/brucellosis
- Discuss the need to cover draining wounds with a dressing and to use condoms for sexual intercourse.

Management of Contacts

Definition
All people with a similar exposure as the case.

Investigation and restriction
Nil.

Prophylaxis
There is no recommendation for prophylaxis of contacts, but prescription of an oral regimen may be discussed with any contact who has a very high risk of developing infection, such as having consumed the same unpasteurised milk product as the case within the incubation period.

Counselling
- Advise all contacts of the incubation period and typical symptoms of brucellosis.
- A fact sheet is available: https://www.health.govt.nz/our-work/diseases-and-conditions/communicable-disease-control-manual/brucellosis
- Encourage contacts to seek early medical attention if symptoms develop.

Other Control Measures

Identification of source
Check for other cases in the community, household and workplace. If the case may have acquired the infection in New Zealand, liaise with Ministry for Primary Industries to investigate potential animal sources of infection (Ph: 0800 809 966).

Disinfection
Clean and disinfect surfaces and articles soiled with purulent discharges. For details, refer to NZ Communicable Diseases Control Manual 2012, Appendix 1: Disinfection, https://www.health.govt.nz/our-work/diseases-and-conditions/communicable-disease-control-manual

Health education

- If there is a cluster of cases, consider a media release and direct communication with relevant occupational groups and health professionals to encourage prompt reporting of symptoms. In communications with doctors, include recommendations regarding diagnosis, treatment and infection control.
- Ensure there are safe procedures in place in meat-processing facilities to prevent exposure, including the use of personal protective equipment, covering broken skin lesions and good ventilation.
- Educate farmers, veterinarians and hunters on the risks of handling potentially infected animals and carcasses, especially domestic and wild swine, placentas, discharges and foetuses. Practices aimed at reducing the risk of leptospirosis (for example, using gloves and covering scratches) will also reduce the risk of brucellosis.
- Educate the public about the risks of consuming unpasteurised milk and cheese.
- A fact sheet is available: https://www.health.govt.nz/our-work/diseases-and-conditions/communicable-disease-control-manual/brucellosis

Reporting

- Ensure complete case information is entered into EpiSurv.
- On receiving a notification and where the case is suspected of having contracted the disease in New Zealand, medical officers of health should immediately notify the Director of Public Health at the Ministry of Health. The Ministry of Health will notify the appropriate staff in the Ministry for Primary Industries so that further investigation of the source can be undertaken.
- If the disease is thought to have been occupationally acquired, this should be notified to the Department of Labour via the notifiable occupational disease system (NODS).
- If a contaminated commercial food source is identified, liaise with the Ministry for Primary Industries
- If a cluster of cases occurs, contact the Ministry of Health Communicable Diseases Team and outbreak liaison staff at ESR, and complete the Outbreak Report Form.
- File.

References and further information

1. NZ Communicable Diseases Control Manual 2012, Brucellosis https://www.health.govt.nz/our-work/diseases-and-conditions/communicable-disease-control-manual
2. UpToDate, Brucellosis, Microbiology, epidemiology, and pathogenesis of Brucella http://www.uptodate.com/contents/microbiology-epidemiology-and-pathogenesis-of-brucella?source =search_result&search=brucellosis&selectedTitle=2%7E88
3. ESR, Surveillance Report, Notifiable Diseases In New Zealand, 2015. https://surv.esr.cri.nz/PDF_surveillance/AnnualRpt/AnnualSurv/2015/2015AnnualReportFinal.pdf

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CDC, Brucellosis Homepage, Clinicians, Humans and *Brucella* Species http://www.cdc.gov/brucellosis/clinicians/brucella-species.html

Heymann DL. Control of Communicable Diseases Manual 20th ed. Brucellosis

MPI, Pests and Diseases, Brucellosis http://www.biosecurity.govt.nz/pests/brucellosis