

Brucellosis (human)

General introduction

Brucellosis is a widespread zoonosis mainly transmitted from cattle, sheep, goats, pigs and camels through direct contact with blood, placenta, fetuses or uterine secretions, or through consumption of contaminated raw animal products (especially unpasteurized milk and soft cheese). In endemic areas, human brucellosis has serious public health consequences. Worldwide, *Brucella melitensis* is the most prevalent species causing human brucellosis, owing in part to difficulties in immunizing free-ranging goats and sheep. In countries where eradication in animals (through vaccination and/or elimination of infected animals) is not feasible, prevention of human infection is primarily based on raising awareness, food-safety measures, occupational hygiene and laboratory safety. In most countries, brucellosis is a notifiable disease.

Causal agent and main modes of transmission

Causal agent: *Brucella abortus*, biovars 1-6, 9; *Brucella melitensis*, biovars 1-3 ; *Brucella suis*, biovars 1,3 and 4; *Brucella canis*. *B. suis* biovar 2 and *B. maris* infections have rarely been described. Infected animals (mainly cattle, sheep, goats, pigs and less commonly dogs and other animals) and their products are the reservoirs and sources of infection.

Main modes of transmission. Ingestion, direct contact through breaks in the skin and airborne infection (laboratories and abattoirs), primarily affecting consumers of raw milk and derivatives, farmers, butchers, veterinarians and laboratory personnel. The incubation period is highly variable, usually 2-4 weeks, can be 1 week to 2 months or longer.

Clinical description and recommended case definition

Clinical description: brucellosis may present with acute or insidious onset, with continued, intermittent or irregular fever of variable duration, profuse sweating, fatigue, anorexia, weight loss, headache, arthralgia and generalized aching. Abscess formation is a rare complication. *Brucella* endocarditis and neurobrucellosis cause most deaths.

Laboratory criteria

Presumptive diagnosis

- Rose Bengal test (RBT) for screening: positive tests to be confirmed by one of the tests mentioned below under *Confirmatory diagnosis* below;
- Standard agglutination test (SAT).

Confirmatory diagnosis

- Isolation of *Brucella* spp. from blood or other clinical specimen.
- A presumptive laboratory diagnosis based on detection of agglutinating antibodies (RBT, SAT) combined with detection of non-agglutinating antibodies through:
 - ELISA IgG test;
 - Coombs IgG.

PCR and new rapid tests such as the lateral flow assay are yet to be accredited.

Case classification (humans)

Suspected: a case that is compatible with the clinical description and is epidemiologically linked to suspected/confirmed animal cases or contaminated animal products.

Probable: a suspected case with presumptive laboratory diagnosis.

Confirmed: a suspected or probable case with confirmatory laboratory diagnosis.

Surveillance

Rationale for surveillance: surveillance is a key element for management of prevention and control programmes.

Recommended types of surveillance: early case-based reporting by care providers or laboratories to upper levels of

public health sector and appropriate levels of animal health sector; in endemic countries where investigation of all reported cases may not be feasible, a representative proportion of reported cases should be investigated routinely.

Recommended minimum data elements

Case-based data

- Case classification.
- Unique identifier, age, sex, geographical information and occupation.

Aggregated data reporting

- Number of cases by case classification (probable/confirmed), age, sex, geographical area, occupation.

Recommended data analyses, presentation, reports

Graphs: Number of probable/confirmed cases by month.

Tables: Number of probable/confirmed cases by age, sex, month, and place.

Maps: Number of probable/confirmed cases by place.

Performance indicators for surveillance

- Completeness and timeliness of reporting.
- Proportion of suspect, probable and confirmed cases.
- Number of investigations compared with number of cases.

Control activities

Case management

Doxycycline 100 mg twice a day for 45 days + streptomycin 1 g daily for 15 days. The main alternative therapy is doxycycline 100 mg twice a day for 45 days + rifampicin 15mg/kg/day (600-900mg) for 45 days. Experience suggests that streptomycin may be substituted with gentamicin 5mg/kg/daily for 7-10 days, but no study directly comparing the two regimes is currently available. Optimal treatment in pregnant women, neonates and children under 8 not yet determined; for children some experience with trimetoprim/sulfamethoxazole (co-trimoxazole) combined with an aminoglycoside (streptomycin, gentamicin) or rifampicin.

Prevention

- Education to avoid consuming unpasteurized milk and milk derivatives.
- Barrier precautions for hunters and professionals at risk (butchers, farmers, slaughterers, veterinarians).
- Careful handling and disposal of afterbirths, especially in cases of abortion.
- Serological or other testing of animals; immunization of herds/flocks may be envisaged; eliminate infected herds/flocks.

Epidemics

Conditions under which epidemics may occur

Distribution of incriminated produce, usually raw milk or cheese from an infected herd/flock.

Management of epidemics

Identify common vehicle of infection; recall incriminated products, stop production and distribution unless pasteurization is introduced.

Drug-resistance monitoring. Not applicable.

Performance indicators for control activities. Number of new cases per 100 000 population over time.

Other aspects

Special considerations/other interventions. The most successful method for prevention and control of brucellosis in animals is vaccination. Control activities to be coordinated and shared between the public health and animal health sectors, who should ensure joint administrative arrangements to facilitate immediate cross-notification of cases, as well as coordination of joint investigations, control, and public health education programmes.

Contacts

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Bibliography

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