Brucellosis (Undulant fever, Mediterranean fever)

What is brucellosis?

Brucellosis is an infection caused by *Brucella* bacteria. There are nine or more recognized species of *Brucella* and more than 30 atypical strains, but only four species—*Brucella abortus, B. melitensis, B. suis,* and *B. canis*—are responsible for nearly all cases of brucellosis in humans worldwide. Brucellosis has been reduced or eliminated in much of the industrialized world through rigorous agricultural control programs and food hygiene, but remains prevalent in the Mediterranean, the Middle East, northern Africa, and Latin America, including Mexico. Brucellosis is relatively uncommon in the United States; between 80 and 140 human brucellosis cases are reported each year, approximately half of which are in residents of Arizona, Florida, Texas, or California.

What are the symptoms of brucellosis?

The symptoms of brucellosis are nonspecific and commonly include fever, sweats, malaise, headache, and back pain. The length of time between exposure and onset of symptoms is usually 1 to 6 weeks, but can be as long as several months. A recurring fever and arthritis are observed if patients go untreated for long periods.Infections that last for more than 12 months can spread to bones, joints, liver, kidney, spleen, or heart valves.

How do people become infected with brucellosis?

Historically, most human infections were acquired through direct contact with infected animals or via deposition of animal reproductive fluids on mucous membranes or cuts and abrasions in the skin. Today, consumption of unpasteurized dairy products is responsible for most cases of brucellosis in the U.S. Only very rare cases of person-to-person transmission have been reported.

How are brucellae maintained in nature?

Brucellae are maintained in domestic and wild animals. Brucellae establish a chronic infection in an animal's reproductive organs, causing abortion and sterility. Brucellae are transmitted between animals through either sexual contact or ingestion of contaminated milk, urine, or reproductive tissues (e.g., aborted fetuses) from infected animals.

Each species of *Brucella* is commonly associated with a specific animal host, for example, *B. abortus* with cattle, *B. melitensis* with sheep and goats, *B. canis* with dogs, and *B.suis* with pigs. These brucellae have also been found in wild animals, such as bison, feral hogs, camels, caribou, and elk.

Who gets brucellosis?

Anyone who consumes unpasteurized dairy products is at risk for getting brucellosis. In California, brucellosis is more common among Hispanics/Latinos. According to California data from 1993 to 2017, of those brucellosis case-patients who reported

consuming unpasteurized dairy products, most reported acquiring the dairy products from outside the United States, most commonly from Mexico.

Ranchers, veterinarians, and abattoir (slaughterhouse) workers may also contract brucellosis through direct contact with infected animals or their tissues. Similarly, hunters and others who handle tissues from wild pigs may be at risk for infection with *Brucella suis*. There are also occasional infections among laboratory workers who manipulate *Brucella* cultures without adequate protective precautions.

How is brucellosis diagnosed?

Because the symptoms of brucellosis are nonspecific, and the disease is relatively uncommon in the United States, healthcare providers might not consider brucellosis when initially evaluating a patient. Growing the bacteria from a blood or tissue sample provides conclusive evidence for *Brucella* infection, but cultures may require special techniques and a longer incubation time to reliably rule in or out brucellosis. Presence of antibodies in the blood can also indicate whether *Brucella* might be the cause of infection, but may require more than one specimen collected over several weeks to reliably identify an active infection. Molecular diagnostic methods such as polymerase chain reaction (PCR) are both rapid and specific, but such techniques are not yet widely available.

How is brucellosis treated?

Patients with brucellosis must be treated with antibiotics for at least six weeks. If therapy is discontinued too early, relapse of symptoms or progression to more serious disease may occur.

How can brucellosis be prevented?

Elimination of the disease in domestic animals is the best means of removing the bacteria from the food supply and thereby reducing risk of infection to the general public. Brucellosis control programs in livestock rely on importation restrictions, vaccination, and/or test-and-slaughter of infected animals. These programs have greatly reduced the incidence of animal disease in developed countries and have resulted in a reduction in the number of human cases. In 2008, the U.S. Department of Agriculture declared all 50 U.S. states free from bovine (cattle) brucellosis.

Most members of the general public can eliminate their risk of brucellosis by selecting only domestic commercial dairy products that are labelled as pasteurized. Veterinarians and others who have contact with live animals should wear protective clothing, including gloves, gowns, and masks, when they have contact with reproductive tissues and periparturient fluids.

For more information about brucellosis, visit:

- CDPH Brucellosis webpage
  https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Brucellosis.aspx

- U.S. Centers for Disease Control and Prevention Brucellosis website
  https://www.cdc.gov/brucellosis/index.html

- World Health Organization Brucellosis fact sheet
  https://www.who.int/news-room/fact-sheets/detail/brucellosis

- U.S. Department of Agriculture National Brucellosis Eradication Program webpage
  https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/cattle-disease-information/national-brucellosis-eradication

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