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Popular Article

Brucellosis: a potential threat to livestock and humans

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Abstract

Brucellosis is one of the world's seven most neglected diseases, with the actual incidence ranging from 5,000,000 to 12,500,000 cases each year. Except in a few developed nations, the disease is widespread globally, but it is significantly undetected in undeveloped countries, where it causes significant health, economic, and livelihood costs. Brucellosis not only impacts animal populations in India, but it is also a significant occupational danger for people involved in livestock-related occupations. The disease's economic impact on the country is estimated to be $3.43 billion in livestock losses, with the bovine industry accounting for more than 95 percent of the total. Brucellosis can be avoided by avoiding unpasteurized dairy products and taking measures while dealing with animals or in a laboratory. Joint and muscular discomfort, fever, weight loss, and weariness are possible symptoms. Some people experience stomach ache and coughing.

Introduction

Brucellosis is a highly contagious zoonosis caused by consuming unpasteurized milk or raw meat from infected animals, or by coming into direct contact with their secretions. It is also known as undulant, Malta, and Mediterranean fever. Brucella bacteria are small, Gram-negative, nonmotile, non-spore-forming rod-shaped (coccobacilli) bacteria that cause this illness. They act as facultative intracellular parasites, producing chronic diseases that might last a lifetime. Humans are infected by four species: B. abortus, B. canis, B. melitensis, and B. suis. B. abortus is a cow illness that is less virulent than B. melitensis. Dogs are affected by B. canis. B. melitensis is the most virulent and invasive species, infecting goats and, on rare occasions, sheep. B. suis is an intermediate virulent pathogen that mostly affects pigs.

Host Animals

Species	Main Animal Host(s)
B. abortus	Cattle
B. melitensis	Goats, sheep, camels
B. suis	Pigs
B. canis	Dogs
B. ovis	Sheep, goats
B. neotomae	Wood rats
B. pinnipediae	Pinnipeds (seals, sea lions, walruses)
B. ceti	Cetaceans (dolphins, porpoises, whales)
B. microti	Common vole

Signs and Symptoms

The symptoms are similar to those of many other febrile disorders, but with a focus on muscle discomfort and nocturnal sweats. The disease's course might range from a few weeks to many months or even years. In the early stages of the disease, bacteremia develops, resulting in the typical trio of undulant fevers, sweating (sometimes with a foul, mouldy odour similar to wet hay), and migrating arthralgia and myalgia (joint and muscle pain). Blood tests often reveal a low amount of white and red blood cells, an increase in liver enzymes such as aspartate aminotransferase and alanine aminotransferase, and positive Bengal rose and Huddleston reactions.

Transmission

In animals' transmission of Brucellosis is to animals by contact with infected animals' placentas, foetuses, foetal fluids, and vaginal discharge. In humans, Brucellosis can be spread to humans by the consumption of tainted dairy products. It can also be transferred to people by organism inhalation or direct contact with contaminated animal fluids. Human-to-human transmission is extremely rare, with transmission happening through blood transfusion, organ and tissue transplantation, sexual contact, and nursing.

Diagnosis

The diagnosis of brucellosis can be made by following

- Confirmation of the bacteria - blood cultures in tryptose broth, bone marrow cultures: The growth of brucella is extremely slow (takes two months to grow).

- Confirmation of antibodies against the agent either with the classic Huddleson, Wright or rose Bengal test.
- Histologic evidence of granulomatous hepatitis on hepatic biopsy

Although serological techniques may be the only testing available in many situations, a definitive diagnosis of brucellosis needs the isolation of the organism from the blood, bodily fluids, or tissues. B. abortus is less frequently detected by positive blood culture yield than B. melitensis or B. suis, which varies from 40 to 70%. The standard agglutination test (SAT), rose Bengal, 2-mercaptoethanol (2-ME), antihuman globulin (Coombs'), and indirect enzyme-linked immunosorbent assay is all methods for identifying specific antibodies against bacterial lipopolysaccharide and other antigens (ELISA). In endemic regions, SAT is the most often employed serology.

Prevention and control

Monitoring and reducing risk factors are the cornerstones of brucellosis prevention. Serological assays for surveillance as well as testing on milk, including the milk ring test, can be used for screening and are crucial to efforts to eradicate the illness. Additionally, individual animal testing is carried out for commercial and disease-control goals. Vaccination is frequently used in endemic areas to lower infection rates. It is possible to employ modified live microorganisms in an animal vaccination. For comprehensive instructions on vaccine manufacture, refer to the World Organisation for Animal Health Manual of Diagnostic Test and Vaccines for Terrestrial Animals. A test and eradication campaign is needed to eradicate the disease since it is getting closer to being done away with. Eliminating animal infections is the most effective preventative technique. In enzootic areas with high incidence rates, vaccination of cattle, goats, and sheep is advised. In places with low frequency, serological or other tests and culling can also be successful. It is important to raise knowledge about food safety, workplace cleanliness, and laboratory safety in nations where eradication of animals by vaccination or the removal of sick animals is not practical.

Treatment and care

Flu-like symptoms such as fever, weakness, malaise, and weight loss are common with Brucellosis. However, the condition can manifest itself in a variety of unusual ways. Many patients' symptoms are modest, and hence the diagnosis may be overlooked. The disease's incubation time can range from one week to two months but is generally 2-4 weeks.

Doxycycline 100 mg twice a day for 45 days and streptomycin 1 g daily for 15 days are treatment alternatives. Doxycycline at 100 mg twice daily for 45 days, with rifampicin at

15mg/kg/day (600-900mg) for 45 days, is the principal alternative therapy. Streptomycin can be replaced with gentamicin 5mg/kg/daily for 7-10 days, although no trial directly comparing the two regimens is presently available. The best therapy for pregnant women, newborns, and children under the age of eight has not yet been found; for children, trimethoprim/sulfamethoxazole (co-trimoxazole) combination with an aminoglycoside (streptomycin, gentamycin), or rifampicin are alternatives.

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