

# *A Study of Brucellosis in Cattles and Humans*

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## **ABSTRACT**

Brucellosis is a common zoonotic illness worldwide. It mainly affects the reproductive part of cattle, which make them sterile and ultimately cause death. The disease may be transmitted directly from cattles to human through the ingestion of raw or unpasteurized milk and by unhygienic practices. Several diagnostic tools are available to screen the disease and then appropriate antibiotic treatments are administered. The lack of knowledge, awareness and pactices related to brucellosis among cattle keepers are the main reason to accelerate the transmission of the disease. The disease can be prevented by the proper education, mass vaccination and isolation/ slaughtering of infected cattles.

## **INTRODUCTION**

**B**rucellosis is a widespread zoonotic disease, which deteriorates the health of cattles and humans worldwide. According to WHO, It is one of the tropical diseases that receive the least amount of attention around the world. India has the highest cattle population in the world, and basically every Indian household has animals, as their primary source of income in rural regions. Due to lack of education and awareness, farmers frequently neglect the health of their cattle, which might result in mortality. More than 5 million human

cases of brucellosis are found all over the world, which is a great public health concern. Brucellosis can be found worldwide, but it is most frequent in Asia, the Mediterranean, the Middle East, Latin America, and Africa. This disease is common in Indian states (Renukaradhya and Rajasekhar, 2002). The disease was first discovered by David Bruce in 1887 in Malta Island. Brucellosis is also known as Malta fever or undulant fever in human. It mainly results in weakness, fever, discomfort and

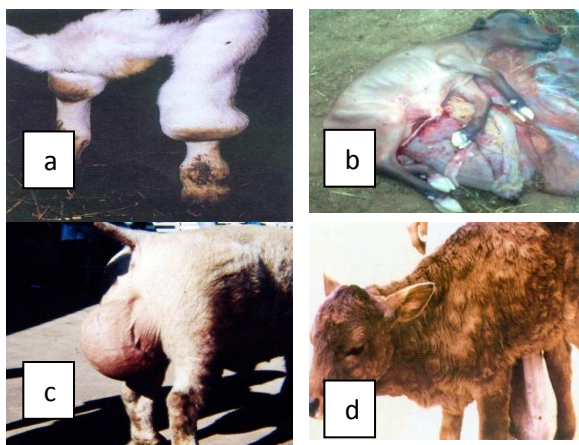
arthritis in people, which may require long antibiotic treatment.

**Causative agent**

Brucellosis is caused by a gram-negative bacteria belonging to the genus *Brucella*. It is almost 0.5-0.7 μm x 0.6-1.5 μm in size, rod shaped, non-motile and non-capsulated cocobacillus. There are several species of *Brucella*, which may infect different hosts including human. *Brucella abortus* is the most common species to infect cattles including buffaloes and cows. *Brucella melitensis* infects small ruminants like sheep and goat and *Brucella suis* infects pig.

**Mode of transmission**

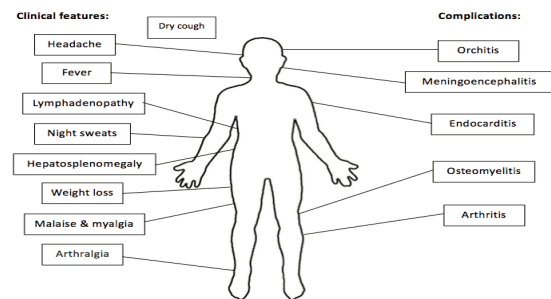
The disease can be transmitted from an infected animal to other animal or to human through any cut or abrasion on skin, inhalation or by unhygienic practices like handling of aborted fetuses/placenta without wearing gloves. Human may get this disease directly by drinking unboiled or unpasteurized milk and milk products or by consuming raw or undercooked meat.



**Fig. 1 Clinical signs of Brucellosis in cattles (a) bilateral carpal hygromata (b) aborted fetus with placenta (c,d) epididymitis**

**Symptoms of Brucellosis**

Brucellosis mainly affects reproductive organ of cattles and causes abortion during IIIrd and Vth month of pregnancy, mastitis, abrasion, delayed heat, retention of placenta in cows, vesiculitis, orchitis, and epididymitis in bulls (fig.1). These conditions in long-term induce infertility in cattle. In human brucellosis causes fever, chills, headache, malaise, back pain, myalgia and lymphadenopathy (fig.2).



**Fig. 2 Clinical signs of Brucellosis in human**

**Diagnosis**

There are many diagnostic tests available to diagnose the pathogen. Some serological tests like Rose Bengal Plate Test (RBPT) are commonly used to screen the presence of *Brucella* in the cattle’s blood. RBPT reagent is mixed with few drops of blood on a clean glass slide; if agglutination occurs then presence of bacteria is suspected and the sample is proceeded for further investigation in laboratory (fig. 3)



**Fig. 3 Rose Bengal plate Test - RBPT reagent is mixed with blood. (a) -ve agglutination (b) +ve agglutination**

Other techniques, such as the Standard Tube Agglutination Test (STAT), Milk Ring Test,

ELISA, and Western Blot are also frequently used to detect microorganisms. RT-PCR can be used to achieve a rapid and accurate diagnosis of *Brucella abortus* in cases of human brucellosis. For the diagnosis of brucellosis, the isolation of *Brucella spp.* is regarded as the gold standard approach. The culture of *Brucella* is specific and permits definitive identification and typing of *Brucella spp.* (Al Dahouk et al., 2003).

### Treatment

Long-term antibiotic therapy is necessary for the treatment of brucellosis. It is recommended that a combination of antibiotics can be used to treat brucellosis, rather than a single antibiotic. The recommended dose of doxycycline is 100 milligram (mg) twice daily for 45 days, and the recommended dose of streptomycin is 1 gram (g) daily for 15 days. The primary alternative therapy consists of taking doxycycline at a dosage of 100 mg twice a day for 45 days, in addition to taking rifampicin at a dosage of 15 mg per kg per day (600-900 mg) for 45 days.

### Vaccination:

Cattle can be vaccinated against brucellosis using a vaccine *B. abortus* RB51 and S19, whereas sheep and goats can be immunized with *B. melitensis* Rev-1. Although vaccination is essential for eradication, it would be an unfathomable effort to vaccinate every calf born in the country due to a lack of knowledge among farmers and a high number of cattles in India.

### Prevention

Good hygienic practices like wearing gloves and mask during handling aborted fetus and placenta, cleaning of cattle sheds regularly by disinfectants, mass vaccination and isolation of diseased calves from healthy ones can prevent

the disease to transmit. Previous studies on knowledge, attitude and practices on brucellosis among farmers show that there is nil knowledge and awareness related to brucellosis is found among farmers in India (Kant et al., 2008).

### CONCLUSION

Globally, both animals and humans are at risk from brucellosis. We need a rapid and reliable diagnostic method for identification of brucellosis. Slaughtering of chronically ill animals is an effective way to stop the transmission of disease. Public knowledge of brucellosis can be increased through awareness campaigns, proper education, and increased coverage in the media. Mass vaccination of all calves and good hygienic practices is mandatory step to eradicate brucellosis in developing countries.

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