Volume 8, Issue 04, 2021, Pp. 305-309.
Available online at: www.indianfarmer.net
ISSN: 2394-1227 (Online)

POPULAR ARTICLE OPEN ACCESS

Brucellosis: Impact on Livestock and Human Health

Priyanka Sheoran[1], Kushal Grakh[2*], Dheeraj Yadav[3]

[1]MVSc Scholar, Department of Veterinary Public Health and Epidemiology
[2]PhD Scholar, Department of Veterinary Public Health and Epidemiology
[3]MVSc Scholar, Department of Veterinary Surgery and Radiology
Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana – 125004

**Corresponding author: kushalgrakh24@gmail.com*

***Article Received**: 14 April 2021* ***Published:** 15 April 2021*

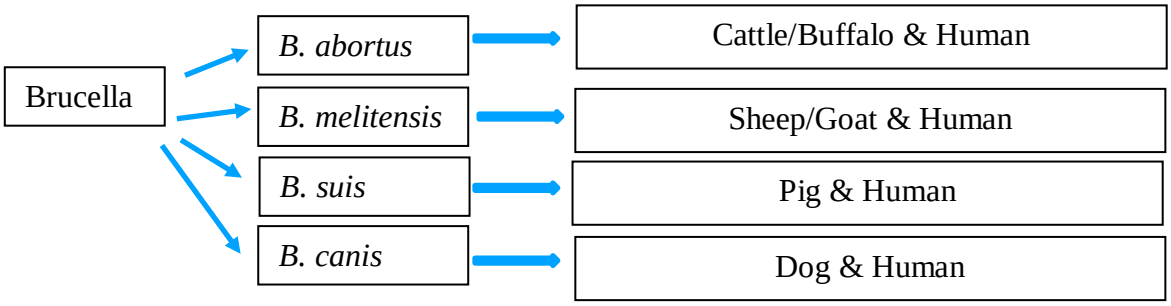
Brucellosis is an infectious disease of livestock mainly cattle, buffalo, sheep, and goats. Brucellosis also occurs in humans by various modes of transmission via animal secretions or other means of contact with animals. The zoonotic nature of this disease thus raises serious public health consequences as close human to animal contact in rural areas provide every chance for the transmission of disease. The animal husbandry and dairying sector in India contributes a huge share of 33 percent in GDP, which itself proves the promising nature of this industry. For the industry to move ahead with greater pace the zoonotic disease need to be addressed and farmers and other stakeholders need to be made aware of the current scenarios of zoonotic diseases.

PREVALENCE

Brucellosis is a disease of high endemicity in animals of different parts of the world including India. In India the close contact of humans and animals due to dependence of rural population on livestock for livelihood predispose humans to brucellosis. In India 80% of the population live in approximately 5,75,000 villages and thousands of small towns; have close contact with domestic/ wild animal population owing to their occupation. Hence, human population stand at a greater risk of acquiring zoonotic diseases including brucellosis. Transmission of bovine brucellosis is estimated to occur at an endemic equilibrium in India, with disease prevalence estimated to be 13.5% in animals. The true prevalence of human brucellosis in India is yet unknown, may be due to lack of awareness and unfamiliarity with zoonotic diseases among medical

professionals. However, it reflects only tip of the iceberg due to lack of proper surveillance and diagnosis.

HOST AND AGENT



TRANSMISSION

Animals- In animals, *Brucellosis* usually spread through contact with infected birth tissues and fluids (e.g., placenta, aborted fetuses, fetal fluids, vaginal discharges). The bacteria can also be found in the milk, blood, urine, and semen of infected animals. Animals can get the bacteria by ingestion (oral), direct contact with mucous membranes (eyes, nose, mouth), or breaks in the skin. *Brucella* can also be transmitted by contaminated objects (fomites) such as, equipment, clothing, shoes, hay, feed, or water. The shedding of *B. abortus* in the semen of bulls has been reported and this may pose a risk of disease transmission by AI. In pigs and dogs, however, sexual transmission is one of the major route of disease spread.

Humans- Can get infection by eating or drinking unpasteurized/raw dairy products. When sheep, goats, cows, or camels are infected, their milk becomes contaminated with the bacteria. In professionals like veterinarians and laboratory workers, occupational exposures are common and such people are greater risk of acquiring infection. Bacteria can also enter the wounds in the skin/mucous membranes. This poses a problem for workers who are in close contact with animals or animal excretions (newborn animals, fetuses, and excretions that may result from birth). Person-to-person spread of brucellosis is extremely rare. The infection is rarely transmitted sexuallyor through blood transfusion and tissue transplantation in humans.

Clinical signs and symptoms in animals

Cattle- Abortion in 5th to 9thmonth of pregnancy, stillborn/weak calf, retention of fetal membranes, swollen testicles in bulls, arthritis with excretion of organisms in the milk and uterine discharges. Udder will remain infected permanently with *Brucella* organisms.

Sheep and Goat- Abortion in the last two months of gestation is the most obvious manifestation. Infections may also cause stillborn or weak lambs, retained placenta and reduced milk yield. Epididymitis, or chitis and reduced fertility in males(common in sheep) are also reported.

Dogs- Male dogs infected with brucellosis develop epididymitis. The dog may become infertile. Female dog with brucellosis will abort at 45-55 days of gestation or will give birth to stillborn or weak puppies, brown-to-yellowvaginal discharge without any foul smell for1–6 weeks may also be seen.

Pigs- Common manifestations are abortion, temporary or permanent sterility, orchitis, lameness, posterior paralysis, spondylitis, and occasionally metritis and abscess formation. Abortion is generally seen between 50 and 110 days of gestation. In boars, orchitis, usually unilateral, may occur, and fertility appears to be reduced.

Horse - Swelling of the neck/back/bursae is common sign, called as fistulous wither or poll evil.Once infected male and female remain carriers for rest of their lives.

Clinical signs and symptoms in humans

Symptoms of brucellosis may show up anytime from a few days to a few months. Symptoms may include fever, chills, generalized weakness and fatigue, headache, muscle aches (myalgia), loss of appetite, weight loss, night sweats, joint pain (arthralgia) and inflammation (arthritis), back pain, constipation and/or a dry cough.

In some cases, brucellosis is characterized by repeated episodes of fever that recur on and off for more than a year. Infection of different organs leading to enlargement of liver, spleen and lymph nodes may also occur.

Samples to be sent for lab diagnosis:

In Animals-placenta, culture from the stomach and lungs of an aborted fetus, supramammary lymph nodes and udder. Udder secretions are the preferred specimens for culture from a live cow. For serological tests, antibodies in milk, whey, and semen can be detected. There is no specific transport medium available to improve *Brucella* isolation.

Therefore,samplesshouldbeshippedundercoldchaintothediagnosticlaboratories.

In Humans- For bacterial isolation, blood, wound, swabs, bone marrow aspirates, cerebrospinal fluid and pus samples are preferred and for immunological diagnosis, serum sample is used.

Where to send the samples?

Samples to be sent to regional disease diagnostic laboratories (RDDL) of state animal husbandry department. In addition, many veterinary colleges/universities provide diagnostic services for brucellosis. The ICAR institutes such as IVRI, Bareilly, UP and National Institute of Veterinary Epidemiology and Disease Informatics also provide diagnostic services.

Human samples should be sent to medical college, AIIMS Delhi, PGIMER Chandigarh. In addition, many other medical colleges and veterinary colleges also provide diagnostic services for human brucellosis.

Diagnosis

Diagnosis is based on bacteriology where bacteria is isolated on selective media in the lab or by serological tests such as Serum agglutination test (SAT), Rose Bengal

Plate Test (RBPT) and the buffered plate agglutination test (BPAT), enzyme-linked immunosorbent assays (Indirect & Competitive ELISA) and fluorescence polarization assay (FPA). Molecular methods such as PCR can also be employed.

Prevention and Control

Threeprinciples can beadopted to control brucellosis on dairyfarms : (1) test and culling/segregation of positive animals, (2) maintainhygeinicmeasures, and (3) vaccination of animals.Calf-hood vaccination of femaleswith*B. abortus* S-19 ispracticedworldwide and now in India. Recently the Government of India has directedthat all bulls used in the production of semen for artificialinseminationshouldberegularlytested and brucellosis free bulls to beused. Withthis directive, practically all the bull farms in the Government and co-operativesectors are subjected to periodic screening. The infected bulls are castrated. *B.melitensis*strain Rev1 vaccine in goats and sheep has resulted in the elimination or near-elimination of brucellosis.

National Animal Disease Control Programme (NADCP) schemeislaunched by Hon'ble Prime Minister in September, 2019 for control of Foot &MouthDisease and Brucellosis by 2025 by vaccinating 100% cattle, buffalo, sheep, goat and pig population for FMD and 100% bovine femalecalves of 4-8 months of age for brucellosis. *Brucella abortus*S19 isused in this program. This is a Central Sector Scheme where 100% of fundsshallbeprovided by the Central Government to the States/UTs.

Economics of brucellosis

Bovine brucellosis cause hugeeconomiclossesto the dairyindustry, whichisestimated to bearound 3.4 billion US dollars to India.Economiclossesmaybe direct (e.g. reducedmilkyield, increasedmortality) and indirect (e.g. vaccination, cullingcosts). Direct impacts mayfurtherbeclassified as visible (e.g. abortion, repeatbreeding), invisible (e.g. lowerfertility), additionalcosts (e.g. treatment, vaccination) and revenue loss (e.g. lessselling).Othercostsincludesfeeding and management loss of pregnantanimals in the event of abortion, labour cost intreatinganimals, cost of antiseptic and detergents, cost of transportation related to treatment, cost of diagnosis etc.It isestimatedthat an abortion wouldcost the farmerapproximately INR 50,000-70,000 (US$ 80-100), which can beeasilyavoided by taking control measures.

India has a limitedchoice or approaches to control brucellosis as the slaughter of cowsisbanned. Also, thereisrenewedconsideration to segregate and quarantine all infectedanimals in a common place till theirdeathwith a view to prevent the spread of infection. The costinvolved in the maintenance of suchinfected and unproductiveanimalsismore and uneconomical. This situation calls for alternateapproachesthatcouldreduce the spread of infection throughrestrictedmovement of infectedanimals, or by increasingherdimmunitythrough vaccination of herds. In humans the loss of productive years due to the diseaseisalso a hugeeconomic loss attributed to brucellosis.

References

OIE Terrestialmanual (2021). Accesedfrom : https://www.oie.int/en/animal-health-in-the-world/animal-diseases/brucellosis/

National Animal Disease Control Programme (NADCP). Accesedfromhttp://dahd.nic.in/sites/default/filess/technical_guidelines_0.pdf

WHO (2021). Accessed from: https://www.who.int/news-room/fact-sheets/detail/brucellosis