Brucellosis

Brucellosis
(Contagious abortion, Bang disease)

- The genus Brucella consists of Gram-negative coccobacilli, strict intracellular parasites of animals.
- It is a zoonotic disease, primarily affecting goats, sheep, cattle, buffaloes, pigs and other animals and transmitted to humans by contact with infected animals or through ingestion of their products.
- The human diseases with various names: Mediterranean fever, Malta fever, undulant fever/remittent fever, Gibraltar fever, Cyprus fever.

- Brucella belongs to family Brucellaceae.
- Genus Brucella encompasses 9 recognized spp—6 terrestrial sp. & 3 marine spp.
- Terrestrial sp. are B.melitensis, B.abortus, B.suis, B.canis, B. ovis, B.neotamae.
- Marine spp are B.delphini, B. pinnipediae, B. cetaceae.
- Brucellae species are small, gram-negative aerobic coccobacilli, 0.5-0.7 µm x 0.6-1.5 µm in size.
- They are nonmotile, noncapsulated, nonsporing and non- acid fast.

- Brucellae are strict aerobes.
- Br. Abortus is capnophilic, many strains requiring 5-10% C02 for growth.
- The media employed currently are serum dextrose agar, serum potato infusion agar, trypticase soy agar, or tryptose agar.
- Erythritol has a specially stimulating effect on the growth of Brucellae.
- On solid media, colonies are small, moist, translucent and glistening after 3 or more days of incubation.
- In liquid media growth is uniform.

Transmission

1. Oral entry : Ingestion of contaminated animal products (often raw milk or its derivatives). contact with contaminated fingers.

2. Aerosols: Inhalation of bacteria. Contamination of the conjunctivae.

3. Percutaneous infection: through skin abrasions or by accidental inoculation.

Pathogenesis

- Intracellular location & survival of the organism contribute to its virulence & pathogenesis.
- All three major species of Brucella are pathogenic to human beings.
- Br. melitensis is the most pathogenic, Br. abortus and Br. suis of intermediate pathogenic.
- Incubation period is 1-4 weeks.

Clinical symptoms

- Abortion is the most obvious manifestation.
- Infections may also cause stillborn or weak calves, retained placentas, and reduced milk yield.
- Usually, general health is not impaired in uncomplicated abortions.
- Seminal vesicles, ampullae, testicles, and epididymides may be infected in bulls; therefore, organisms are present in the semen.
- Testicular abscesses may occur.
- Longstanding infections may result in arthritic joints in some cattle.

Diagnosis

- Culture and isolation
- Serology: both IgG and IgM antibodies appear in the serum 7-10 days after infection.
- IgM antibodies persist for up to 3 months after which these antibodies decline.
- In chronic brucellosis only IgG can be demonstrated, as IgM are absent.
- As IgG antibodies persist for many months or years, demonstration of significant rise in the antibody titer is the definitive serological evidence of brucellosis.
- Antibody titer of 1: 160 is the presumptive evidence of Brucella infection.

- Most serological studies for diagnosis of Brucellosis are based on antibody detection, These include:
- Serum agglutination test –SAT (standard tube agglutination)
- Rose Bengal test- Slide agglutination
- ELISA
- Complement fixation
- Immunecapture-agglutination
- Whole cell preparations of Brucella antigens are used in IFA, Agglutination.
- Purified LPS/ Protein extracts are used for ELISA.

- Brucella skin test
- Brucella skin test is a delayed type of hypersensitivity reaction to brucella antigen.
- In this test, brucellin, a protein extract of the bacteria, is used as an antigen and is administered intradermally.
- The presence of erythema and induration of 6 mm or more within 24 hours is suggestive of positive reaction.
- This test is positive only in chronic brucellosis but negative in acute brucellosis.
- Repeated negative skin test excludes brucellosis.

- Milk ring test
- This is a frequently used serological test for demonstration of antibodies in the milk of an animal.
- This is a screening test used to detect the presence of Brucella infection in infected cattle.
- In this test, a concentrated suspension of killed B. abortus or B. melitensis stained with hematoxylin is used as antigen.
- This test is performed by adding a drop of colored brucella antigen to a sample of whole milk in a test tube.
- Then it is mixed, and mixed suspension is incubated in a water bath at 70°C for 40-50 minutes.
- In a positive test, if antibodies are present in the milk, the bacilli are agglutinated and raised with the cream to form a blue ring at the top, leaving the milk unstained.
- In a negative test, the milk remains uniformly blue without formation of any colored ring.

Treatment,Prevention & Control

1. Persons handling the animals should use protective clothing and gloves.
2. Pasteurisation or boiling of milk should be done.
3. Vaccination: Cattle should be vaccinated with live attenuated Br. abortus strain 19, RB 51 for cows.
4. Unimmunized infected animals should be slaughtered.
5. Br. abortus strain 19-BA, a more attenuated variant of strain 19, has been widely employed for human immunisation.