

Popular Article

Anaplasmosis in Bovines

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Anaplasmosis, also called Gall sickness, yellow-bag or yellow-fever, is a tick-borne disease of ruminants caused by obligate intraerythrocytic rickettsia infection. It is characterized by initial high fever, weakness, anemia, emaciation, Uncoordinated movements and Jaundice.

Anaplasma marginale (most pathogenic) primarily in cattle but also reported in buffalo, sheep, goat and some wild ruminants

- *Anaplasma centrale* Ruminants
- *Anaplasma bovis* Ruminants
- *Anaplasma ovis* (Sheep and goats).

In general, tick vectors of *A. marginale* include *Boophilus* spp., *Dermacentor* spp., *Ixodes ricinus* and *Rhipicephalus* spp., while *Amblyomma* spp. do not appear to transmit *A. marginale*

Transmission

Anaplasma marginale can be transmitted by three methods

1. **Biological transmission** - Biological transmission occurs through ticks. Once a tick acquires the organism through a blood meal, the organism infects the tick's gut cells, and Malpighian tubules. Over time, other tissues within the tick, including salivary glands, become infected. When a tick feeds on cattle, it transmits the organism through its saliva.
2. **Mechanical Transmission** - Mechanical Transmission by blood sucking flies and human error it can transmit the organism from infected or carrier animal to susceptible animal within five minutes

Blood sucking flies

Long biting mouth parts penetrate through the skin e.g., Horse-flies (Family Tabanidae) Stable fly (*Stomoxys calcitrans*) and sometime mosquitoes also short mouth parts don't penetrate through the skin e.g., horn fly (*Haematobia irritans irritans*)

Human error

Man is also an excellent transmitter of Anaplasmosis through reusing of needles, dehorners, ear taggers, castrating knives or other surgical instruments, tattoo instruments, and blood transfusion

Transplacental

- Transplacental (intrauterine) transmission is also reported □ Infected erythrocytes move across the placenta in the uterus from infected cows to their offspring, without amplification of *A. marginale* This transmission appears to occur during the second or third trimester of pregnancy.

Life cycle

- Anaplasma species enter the body by infective ticks.
- They invade mature erythrocytes
- Within the erythrocyte, the rickettsia replicates by binary fission to form an inclusion body consisting of 8–12 initial bodies
- Organism leave erythrocytes by exocytosis and infect new erythrocytes in endless cycle
- Exit organisms from the erythrocyte does not involve destruction of the host's cell
- Infected erythrocytes are phagocytized by the reticuloendothelial system
- The phagocytosis of erythrocytes results in mild to severe haemolytic anaemia and icterus without hemoglobinemia or hemoglobinuria
- In the tick, the rickettsia infects midgut cells, where there is a first cycle of replication and from here dense forms move to other tissues
- After several rounds of replication, dense forms travel to the salivary glands where the rickettsia is transmitted to a new mammalian host

Clinical Signs

- Pyrexia with rapid loss of milk production
- Anemia with very pale mucous membranes
- Rapid breathing with excessive salivation
- Nervous signs and abnormal behavior in some cattle
- Acute anaplasmosis is most common
- This is seen in cattle up to three years old and is occasionally found in cattle between one and two
- Progressive pyrexia reaching 41°C
- Anemia, weakness and loss of milk yield
- Depression, inappetence, dehydration and labored breathing
- Enlarged lymph nodes
- Jaundice or abortion in some cattle
- Temporary loss of fertility in Bulls

Treatment

- Tetracycline (tetracycline, chlortetracycline, oxytetracycline, rolitetracycline, doxycycline, minocycline)) is an excellent antibiotic for treating an acute case of anaplasmosis when you treat in time
- Oxytetracycline (OTC) (30 mg/kg of a 300 mg/ml solution IM once; 30 mg/kg of a 300 mg/ml solution IM twice at a 5-day interval; and 22 mg/kg of a 200 mg/ml solution IV q24h for 5 days, which is the former OIE recommendation mentioned earlier)
- Imidocarb is also highly efficacious against *A. marginal* as a single injection (as the dihydrochloride salt at 1.5 mg/kg, SC, or as imidocarb dipropionate at 3 mg/kg)
- Enrofloxacin is less effective

Control and Prevention

- Maintenance of Anaplasma-free herds through import and movement control, testing, and elimination of carrier cattle
- Vector control
- Prevention of iatrogenic transmission
- Administration of antibiotics
- Preimmunization with live vaccines and immunization with killed vaccines
- The Anaplaz vaccine (Fort Dodge) and the Plazvax vaccine (Schering-Plough) previously both vaccines are used in the USA but now removed from the market
- Recent proteomic and genomic research approaches have permitted to identify 21 new proteins within the outer membrane immunogen in addition to the well-characterized MSP (MSP1–MSP5)