

## **BABESIOSIS (TEXAS FEVER, REDWATER FEVER, CATTLE TICK FEVER, EQUINE PIROPLASMOSIS or BILIARY FEVER)**

Babesiosis is caused by intraerythrocytic protozoan parasites of the genus *Babesia*. Transmitted by ticks, babesiosis affects a wide range of domestic and wild animals and occasionally people.

- ❖ Although the major economic impact of babesiosis is on the cattle industry, infections in other domestic animals, including horses, sheep, goats, pigs, and dogs,.
- ❖ Two important species in cattle—*B bigemina* and *B bovis*—are widespread in tropical and subtropical areas and are the focus of this discussion

### **Transmission**

The main vectors of *B bigemina* and *B bovis* are *Rhipicephalus (Boophilus)* spp ticks, in which transmission occurs transovarially. Although the parasites can be readily transmitted experimentally by blood inoculation, mechanical transmission by insects or during surgical procedures has no practical significance. Intrauterine infection has also been reported but is rare.

### **Epidemiology**

- At high levels of tick transmission, all calves become infected with *Babesia* by 6 months of age, show few if any clinical signs, and subsequently become immune.
- Introduction of susceptible cattle to endemic areas and the incursion of *Babesia*-infected ticks into previously tick-free areas.

### **Pathogenesis**

*B bovis* is a much more virulent organism than *B bigemina*. With most strains of *B bigemina*, the pathogenic effects relate more directly to erythrocyte destruction. With virulent strains of *B bovis*, a hypotensive shock syndrome, combined with generalized nonspecific inflammation, coagulation disturbances, and erythrocytic stasis in capillaries, contribute to the pathogenesis.

### **Clinical Findings**

1. The acute disease generally runs a course of ~1 week.
2. The first sign is fever (41°C), which persists long, accompanied later by inappetence, increased respiratory rate, muscle tremors, anemia, jaundice, and weight loss.
3. Hemoglobinemia and hemoglobinuria occur in the final stages.
4. CNS involvement due to adhesion of parasitized erythrocytes in brain capillaries can occur with *B bovis* infections.
5. Either constipation or diarrhea may be present.
6. Late-term pregnant cows may abort, and temporary infertility due to transient fever may be seen in bulls.
7. Animals that recover from the acute disease remain infected for a number of years with *B bovis* and for a few months in the case of *B bigemina*.

## Diagnosis

- Clinically, babesiosis can be confused with other conditions that cause fever, anemia, hemolysis, jaundice, or red urine.
- Therefore, confirmation of diagnosis by microscopic examination of Giemsa-stained blood or organ smears is essential.
- From the live animal, thick and thin blood smears should be prepared, preferably from capillaries in the ear or tail tip.
- Smears of heart muscle, kidney, liver, lung, brain, and from a blood vessel in an extremity (eg, lower leg) should be taken at necropsy..
- A number of serologic tests have been described for detection of antibodies to *Babesia* in carrier animals. indirect fluorescent antibody test and ELISA.
- PCR and real-time PCR assays capable of detecting extremely low parasitemias,

## Treatment

1. For treating cattle, **Diminazene** is given IM at 3.5 mg/kg.
2. Or **Imidocarb** is given SC at 1.2 mg/kg. At a dosage of 3 mg/kg, imidocarb provides protection from babesiosis for ~4 wk and will also eliminate *B bovis* and *B bigemina* from carrier animals.
3. Supportive treatment is advisable, particularly in valuable animals, and may include the use of anti-inflammatory drugs, corticosteroids, and fluid therapy.
4. Blood transfusions may be life-saving in very anemic animals.

## Control

- Vaccination using live, attenuated strains of the parasites has been used successfully in a number of countries.
- One vaccination produces adequate immunity for the commercial life of the animal.
- Although controlling or complete eradication of the tick vector can break the transmission cycle, this approach is rarely feasible in the longterm and can lead to large, susceptible populations in endemic areas with consequent risk of outbreaks of disease in naive animals.

## Other Important *Babesia* of Domestic Animals

More than 100 species of *Babesia* have been isolated from domestic animals and wildlife. The following are indicative of those affecting domestic animals.

### Horses (**EQUINE PIROPLASMOSIS**):

Equine babesiosis is caused by *Theileria* (formerly *Babesia*) *equi* or *B caballi*. *T equi* is a small parasite and is more pathogenic than *B caballi*. *T equi* was reclassified as a *Theileria*. Equine babesiosis is found in Africa, Europe, Asia, South and Central America, and the southern USA. It is transmitted by ticks of the genera *Rhipicephalus*, *Dermacentor*, and *Hyalomma*. Intrauterine infection, particularly with *T equi*, is also relatively common.

### **Sheep and Goats:**

Although small ruminants can be infected by several species of *Babesia*, the two most important species are *B. ovis* and *B. motasi*, transmitted by *Rhipicephalus bursa* and *Haemaphysalis* spp, respectively. Infection is of importance in the Middle East, southern Europe, and some African and Asian countries.

### **Dogs and Cats (BILIARY FEVER):**

*Babesia* species have been reported in dogs from most regions. These include *B. canis*, *B. vogeli*, and *B. rossi*. *B. canis* is transmitted by *Dermacentor reticularis* in Europe, *B. vogeli* by *Rhipicephalus sanguineus* in tropical and subtropical countries, and *B. rossi* by *Haemaphysalis leachi* in South Africa.

- Consequences of *Babesia* infection vary from a mild, transient illness to acute disease that rapidly results in death.
- *B. gibsoni* is the other important *Babesia* of dogs and is a much smaller parasite. It has a more limited distribution and characteristically causes a chronic disease with progressive, severe anemia that is not readily treated with normal babesiacides.

Illness of varying severity due to *B. felis* in domestic cats has mostly been reported in southern Africa.

- An unusual feature of *B. felis* is its lack of response to the normal babesiacides.
- However, primaquine phosphate (0.5 mg/kg, IM, twice with a 24-hr interval) is reported to be effective.