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## Tick Disease(s)

Most people have never heard of Tick Disease - though it has been causing red blood cell destruction in their canine (all types of dogs) hosts all over the world. Tick Disease organisms are spread by ticks and are of particular significance to racing greyhounds and pit bulls. Humans may also become infected.

There are several different Tick Diseases that your dog can get here on Guam. Ticks range in size from full grown at the size of a raisin to full grown at the size of a pinhead. Some are easy to see and some are very difficult to find. The diseases go by the names;

**Babesia – Babesiosis      Ehrlichia - Ehrlichiosis      Anaplasma – Anaplasmosis      Borrelia – Lyme Disease**

### HOW INFECTION HAPPENS AND WHAT HAPPENS NEXT

Infection occurs when an infected tick bites a dog and releases sporozoites into the dog's bloodstream. A tick must feed for 2-3 days to infect a dog with Tick Disease. The young organisms attach to red blood cells, eventually penetrating and making a new home for themselves within. Inside the red blood cell, the tick disease organism divests its outer coating and begins to divide, becoming a new form called a "merozoite" which a new tick may ingest during a blood meal. **Infected pregnant dogs can spread Babesia to their unborn puppies and dogs can transmit the organism by biting another dog as well.** The other forms of tick disease are not spread to the puppies from the mother, nor can they be spread by bite wounds.

Having a parasite inside one's own red blood cells does not go undetected by one's immune system. Infected red blood cells are identified and destroyed which kills the organism but, unfortunately, if many red blood cells are infected this leaves the host with anemia, a lack of red blood cells. Often the host's immune system will begin destroying the uninfected red cells as well. **Symptoms include weakness, jaundice, fever, red or orange colored urine. Often as many as 50% of patients will require blood transfusions. Any bleeding not due solely to an injury (on Guam) is suspect of having Tick Disease, especially nose bleeds.**

Making matters worse is the fact that animals seem to get sicker than the degree of anemia would suggest so that there is more to this infection than the actual destruction of red blood cells. The severe inflammation that is associated with this parasitism can be overwhelming and completely separate from the anemia. The platelet counts can drop, thus impairing normal blood clotting. An assortment of neurologic signs of can occur with Tick Disease infection when parasites sequester inside the central nervous system and generate a more localized focus of inflammation. In severe cases there is a lung injury similar to what people with late stage malaria can experience. Thus, Tick Diseases can manifest themselves as any type of illness.

If the acute symptoms are relatively mild or at least non-lethal, a chronic infection can develop. This is usually without symptoms but the dog may continue to be a source of infection to feeding ticks. Relapses can also occur with stress.

Because all these diseases are tick-borne infections, it is not unusual for infected dogs to have several/multiple tick-borne infections such as Ehrlichiosis, Anaplasmosis, Lyme Disease, and others. These infections may interact to make each other more severe. **Young dogs tend to be most severely infected, especially Pit Bull terriers.**



## DIAGNOSIS OF Tick Disease

If one is very lucky, the Tick Disease organisms can be seen on a blood smear. *Babesia canis* organisms are tear-shaped and occur in pairs. Other Babesia species have several forms in which they appear. Odds of finding the organisms are improved by checking freshly drawn blood taken from a capillary source ( a small cut to an ear, for example) rather than from a blood vessel. If Babesia organisms are found, the patient is definitely infected but they are hard to find so an alternative method of diagnosis is needed.

Antibody testing has been problematic as infected animals may have circulating antibodies long after the organism is gone or may have no antibodies circulating while a few organisms remain hidden inside red blood cells. However the new ELISA tests are very specific and accurate. They will show positive results by turning the appropriate test spot blue.

When in doubt, your veterinarian can send blood to a lab for PCR testing. This is extremely sensitive testing and can distinguish 4 different species of Babesia, numerous species of Ehrlichia, and many others. While only certain laboratories run this type of testing, this is really the best method of answering the Tick Disease infection question.

Here in Micronesia we usually detect the disease with a combination of an Elisa test, a CBC (complete blood count), and a blood smear, either from the ear or a blood vessel.

## TICK DISEASE TREATMENT

Therapy for Tick Disease is not a benign under-taking. In fact, if a dog is NOT symptomatic with tick disease, treatment is not worth the side effects. Though most of the types of tick disease can be cured relatively easy, owners just need to give the medication as directed. **Female dogs testing positive for Babesia should not be bred.**

### Imidocarb Dipropionate (Imizol)

This is the only drug approved for Babesiosis in the U.S. A single injection may be effective for *Babesia canis* but two injections given two weeks apart are needed for *Babesia gibsoni* and the other smaller Babesias. The injection is painful plus causes muscle tremors, drooling, elevated heart rate, shivering, fever, facial swelling, tearing of the eyes, and restlessness. This drug also works very well on Ehrlichiosis, and the other tick diseases. Pre-treatment with an injection of atropine helps palliate the side effects.

Also, this drug does not mix well with most of the insecticides we use. **Thus, no flea or tick products should be used within 24 hours of these injections, unless specifically indicated by your veterinarian.**

### Doxycycline

This drug is usually given alone or along with the Imidocarb. It is usually given twice daily, for 30 days.

## HUMAN BABESIOSIS and LYME DISEASE and ANAPLASMOSIS

In the U.S. Babesia chiefly occurs on the East Coast and along the Great Lakes. *Babesia microti* is the species that infects humans and is associated with a 5% mortality rate. Treatment is similar to that for malaria: blood transfusion, quinine, and clindamycin. New species of Babesia have been diagnosed in humans in California, Washington State, and Missouri.

Lyme Disease is present in all 50 states, and has now been diagnosed in Guam. It is a horrible debilitating disease and people who get exposed to ticks should be aware of the symptoms. Immediate treatment is recommended for anyone suspected of having Lyme Disease. Lyme Disease is a reportable disease here in Guam.

Anaplasmosis is also a tick disease that humans get and is a reportable disease on Guam. Your doctor can treat this fairly easily.

## TREATMENT FAILURE – why wasn't my dog's disease cured?

The major cause of animals not being cured by the treatment is:

- 1) Failure to give the medication as directed or for the whole 30 days. –and/or-
- 2) Fail to prevent continuing tick infections/presence by using Preventic/Frontline or other quality products suggested by your vet.
- 3) Some dogs simply need a second round of Doxycycline or a switch to another drug.