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## Hemolytic Anemia

### Issue Description

Canines are predisposed to developing many different autoimmune conditions. One of the most common autoimmune disorders to affect dogs is autoimmune hemolytic anemia (AIHA), which is also known as immune-mediated hemolytic anemia (IMHA). AIHA can occur as a primary condition or a secondary condition related to other autoimmune disorders or malignancies. Autoimmune hemolytic anemia is characterized by the development of autoantibodies that destroy red blood cells.

### Other Names

AIHA, Autoimmune Hemolytic Anemia, Immune-Mediated Hemolytic Anemia, IMHA

### Causes

AIHA in canines occurs as a result of genetic and environmental factors. Dogs who are genetically predisposed develop AIHA when they're exposed to certain environmental triggers. There have been several reports of canine AIHA caused by bee stings due to the constituents present in bee venom, especially melittin, histamines, hyaluronidase, hemolysins and phospholipase A. Other causes of AIHA include infectious agents (bacteria, viruses, and parasites), zinc toxicity from the ingestion of pennies, vaccinations, and certain medications, including antibiotics and analgesics.

Canine autoimmune hemolytic anemia may also occur as a feature in canines with various neoplasms, including leukemia, lymphoma, myeloma and various tumors. In addition, canine AIHA can occur in dogs with other autoimmune disorders, especially systemic lupus erythematosus and canine hypothyroidism.

### Breeds Affected

Females of all breeds, even when they are spayed, have a higher risk for AIHA than males. Although all breeds can be affected, certain breeds have a genetic predisposition for developing AIHA due to changes in their immune system regulation, a deficiency of pyruvate kinase enzymes, or abnormalities in their red blood **cell morphology**.

#### Breeds at higher risk for AIHA include:

- Old English Sheepdogs
- American Cocker Spaniels
- Poodles
- Lhasa Apsos
- Daschunds
- English Springer Spaniels
- American Springer Spaniels
- Alaskan malamutes
- Beagle breeds
- Basenjis
- West Highland White Terriers
- Shih Tzus

### Symptoms

Symptoms of canine autoimmune hemolytic anemia vary in severity (from very mild to fatal) depending on the titer of red blood cell autoantibodies and the dog's general health. Fatality is most likely to occur when there is severe and

rapid red blood cell destruction or liver involvement. However, fatality can also result from secondary complications. These complications include the release of coagulants from dying red blood cells. These coagulants, in turn, can cause the formation of blood clots that lodge in the heart or lungs. In addition, fragments of red blood cells or complexes of red blood cells and autoantibodies can lodge into the kidneys and interfere with renal function.

Symptoms of canine AIHA include:

- Anemia, with low red blood cell count, hemoglobin and/or hematocrit
- Fever
- Depression
- Weakness
- Fatigue
- Pallor of the mucus membranes
- Hematuria (presence of blood in the urine)
- Enlarged Spleen
- Seizures
- Peripheral neuropathy

## Diagnosis

- Nonregenerative anemia
- Spherocytosis seen on blood smear
- Positive direct Coombs test

## Treatment

Treatment consists of corticosteroids such as prednisone and prednisolone as well as other immunosuppressant medications such as cyclophosphamide. Most canines respond well to a course of treatment lasting several months. In cases of relapse, a longer course of medication may be required. Other therapies for more severe cases include blood transfusions, splenectomy, and intravenous immunoglobulin therapy.

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