



DANADA VETERINARY HOSPITAL, P.C.

Anemia In Dogs And Cats

Under normal conditions, red blood cells are produced in the bone marrow, or core of the bones, in response to hormone signals from the kidneys. Red blood cells mature in the bone marrow, then get released into the body. Once released, the red blood cells live about 120 days in dogs and about 60-70 days in cats before getting broken down and replaced by new cells.

The primary function of red blood cells is to carry energy and oxygen throughout the body. They also play a role in removing waste products such as carbon dioxide from the body. They play a vital role in keeping an animal's body healthy and strong.

When the overall number of red blood cells in the body is deficient, it is called anemia. This condition can be caused by either bleeding, a premature destruction of cells, or a lack of production from the bone marrow. Anemia is not a diagnosis, but a clinical sign associated with a number of underlying diseases. When anemia occurs, it results in an overall deficiency of oxygen and energy delivery throughout the body. Oxygen deprivation causes both short-term and long-term damage to organs.

Clinical Signs/Symptoms

The most easily observed clinical sign of anemia is pale mucus membranes (the loss of pinkness in the gums). Additionally, anemic animals can exhibit signs consistent with low oxygen levels such as lethargy, poor appetite, and increased respiratory effort. Some symptoms are dependent on the underlying cause of the anemia. For instance, blood loss in the GI tract can cause bloody vomit or tarry black stools. Blood loss into the chest or abdominal cavities can cause abdominal distension, labored breathing, or collapse. If the anemia is caused by red blood cell destruction, the skin may have a yellow tint (jaundice or icterus). When certain cancers are the underlying cause of anemia, the lymph nodes, spleen, intestines, or liver might be enlarged.

Diagnosis and Evaluation

The initial diagnostic test that your veterinarian will run when suspecting anemia is a blood test. This test helps determine the severity of the anemia and the ability of the bone marrow to respond to the anemia. The most common test for anemia is the packed cell volume (PCV); it is also called the hematocrit. This is a measure of the percentage of red cells in the blood. A PCV takes only a few drops of blood and can be performed in about five minutes. The normal PCV of the dog is 37-55%; anemia is defined as a PCV below 37%. In cats, the normal PCV is 25-45%, and anemia is PCV that is below 25%.

The next step is to determine if the bone marrow is responding to the anemia. This is evaluated by measuring the immature red blood cells in circulation, also known as the reticulocyte count. When

anemia is caused by blood loss or destruction, young red blood cells are sent into circulation early to make up for lost cells. These cells are the army reserves coming to the rescue when they are needed. A high reticulocyte count reflects a strong response from the bone marrow; this is called a “regenerative anemia,” and it indicates a loss or destruction of red blood cells. When the marrow appears unresponsive based on reticulocyte numbers, this is called a “non-regenerative anemia.” Non-regenerative anemia usually indicates a suppression of bone marrow because of chronic illness or cancer. However, bone marrow does require 3-5 days to increase production after a sudden blood loss or destruction of cells, so some regenerative anemias may not be immediately clear if they are caught within the first few days of starting.

The blood panel can also shed light on causes of anemia by addressing overall organ function, protein levels, and electrolytes.

A **blood smear** may be used to look for parasites that might be causing red blood cell destruction and abnormal cells that could indicate leukemia. Tests to look for immune-system destruction of red blood cells, such as a Coombs Test, and slide auto-agglutination test may also be done at this time.

Tick disease titers are beneficial to rule out Ehrlichia, Anaplasma, and Rocky Mountain Spotted Fever, Cytauxzoon, or other tick-borne diseases as causes for the anemia.

A **fecal test and urinalysis** can provide valuable information about the total health of your pet. A fecal exam is also important for identification of parasites in the intestinal tract that might be causing blood loss.

X-rays and Ultrasound are used to identify masses, free fluid/bleeding, or other irregularities in the size, shape, or architecture of internal organs.

When leukemia or bone marrow cancer are suspected, a **bone marrow biopsy or aspirate** is the only way to get definitive diagnosis. It involves recovering a small sample of cells from the bone marrow for evaluation by the veterinary pathologist.

Causes/Transmission

There are many diseases that cause anemia. As discussed above, these are grouped into 1) diseases that cause blood loss, 2) diseases that cause hemolysis (red blood cell breakdown), and 3) diseases that decrease the production of red blood cells.

The main causes of blood loss in dogs and cats include:

Trauma or injury that severs blood vessels or internal organs

Parasites such as fleas, ticks, and hookworms

Tumors of the intestinal tract, kidneys, spleen, heart, and urinary bladder

Diseases that prevent proper clotting of blood (Hemophilia, Platelet disorders)

Gastrointestinal bleeding or ulcerations

The main causes of hemolysis in dogs and cats include:

Autoimmune disease (such as immune mediated hemolytic anemia or IMHA)
Blood parasites (Tick Borne Diseases)
Chemicals or toxins
Neoplasia (cancer)

The main causes of bone marrow suppression in dogs and cats include:

Any severe, chronic disease (especially kidney disease)
Very poor nutrition or nutritional imbalances
Autoimmune disease affecting the bone marrow
Chemicals or toxins
Neoplasia (cancer)

It is noteworthy that while iron deficiency anemia is a common finding in people, especially women, it is uncommon in dogs and only occurs secondary to some form of chronic blood loss.

Treatment

Mild to moderate anemias (PCV>20%) are managed by targeting the underlying cause of the illness. For chronic diseases that affect bone marrow production of red blood cells, correction of the underlying condition may be enough to correct the anemia. For mild anemias from blood loss and for most immune mediated anemias, treatment involves medications to target the underlying cause. These may include antibiotics, dewormers, GI protecting medications, or immune suppressive agents.

When anemia stems from large volumes of blood loss, surgery is usually necessary to improve outcome. This can include surgery to remove bleeding masses, or to repair damage such as ulceration or perforation of tissues.

If your pet's anemia is so severe that it is life-threatening, treatment may need to start with a blood transfusion. The main purpose of a transfusion is to stabilize the patient long enough that a determination of the cause of the anemia can be made. Transfusions buy time, but do not address the source of anemia, or improve long-term prognosis unless the cause of the anemia can be found and addressed.

Prognosis

The prognosis for anemia can be highly variable. It is dependent upon identification of the underlying cause and a positive response to appropriate therapy. Sometimes, the prognosis may not be clear until all diagnostics can be completed, and the patient has sufficient time to respond to treatment. This can sometimes take several days or even weeks.