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ANEMIA IN THE DOG

What does it mean to be “anemic”?

Anemia is a medical term meaning a reduced number of red blood cells (RBC's), hemoglobin, or both. It is not a specific disease but the result of some other disease process.

How is anemia diagnosed?

The most easily observed clinical sign of anemia is a loss of the normal pink color of the gingivae (gums). Anemic dogs also have little stamina so they seem listless or tired. Pale gums and lethargy indicate the need to perform blood tests.

There are several tests that are performed on the blood sample to diagnose anemia. The most common test is the **packed cell volume (PCV)** or **hematocrit (HCT)**. A blood sample is processed in a centrifuge to separate the red blood cells from the plasma (the liquid part of the blood). Once separated, the sample is measured to determine what percentage of the sample is made up of red blood cells. Thirty-five to fifty-five percent of the normal dog's blood will be red blood cells. If the PCV is below 35%, the dog is anemic. Others tests to determine anemia include the **red blood cell count** and the **hemoglobin count**. If these are below $5.5 \times 10^6/\text{mm}^3$ or 12 g/dl, respectively, the dog is anemic.

What other tests are important when a dog is anemic?

It is important to know if the bone marrow is producing an increased number of new red blood cells to replace those lost. Often, this can be determined by a study of the stained **blood smear**. The presence of increased numbers of immature (young) red blood cells called *reticulocytes* usually means the bone marrow is responding to the need for more red blood cells.



A careful study of the blood smear is also important to look for parasites that might be causing red blood cell destruction and abnormal cells that could indicate leukemia (high white blood cell count).

If anemia is present, a **reticulocyte count** is usually performed to determine if the body is regenerating or producing new red blood cells from the bone marrow. A special stain is used to clearly identify reticulocytes (immature red blood cells).

A **bone marrow biopsy or aspirate** is obtained if there is concern that the bone marrow is not responding appropriately to the anemic state. A sample of bone marrow is withdrawn and analyzed, providing valuable information about the cause of some anemias and the condition of the bone marrow.

A **biochemical profile** and **urinalysis** are also important tests for anemic dogs. These tests evaluate organ functions and electrolyte levels. They will often provide important information about the overall health of the dog.

A **fecal exam** is important to identify the presence of parasites in the intestinal tract that might be causing blood loss.

What diseases cause anemia?

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

What diseases of dogs cause blood loss?

The main causes of blood loss in dogs include:

Trauma or injury that severs blood vessels or damages internal organs, causing persistent bleeding

- A.** Heavy burdens of parasites such as fleas, ticks, and hookworms
- B.** Tumors of the intestinal tract, kidneys, urinary bladder and spleen.
- C.** Diseases that prevent proper blood clotting or damage or reduce the number of blood platelets.

What diseases of dogs cause hemolysis?

The main causes of hemolysis in dogs include:

- A.** Autoimmune disease
- B.** Blood parasites
- C.** Chemicals or toxins
- D.** Neoplasia (cancer)

What diseases of dogs prevent red blood cell production through bone marrow suppression?

The main causes of bone marrow suppression that result in decreased red blood cell production include:

- A.** Any severe, chronic disease
- B.** Very poor nutrition or nutritional imbalances

C. Autoimmune disease

D. Hypothyroidism

E. Chemicals or toxins

F. Neoplasia (cancer)

There has been no mention of iron deficiency. Why not?

Iron deficiency anemia is a common disease in people, especially women. However, this is not common in dogs and is usually secondary to some form of chronic blood loss. It is occasionally seen in puppies with severe hookworm infections or that are being fed very poor diets.

How are anemic dogs treated?

If your dog's anemia is so severe that it is life threatening, a blood transfusion will be needed. This may be performed immediately after a blood sample is taken for diagnostic testing purposes. The main purpose of a blood transfusion is to stabilize the dog long enough that a determination of the cause of the anemia can be made.

Further treatment will be determined once the underlying disease causing the anemia has been diagnosed.

*This client information sheet is based on material written by Ernest Ward, DVM.
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