Countryside Animal Hospital
2410 North Highway 53
LaGrange KY 40031
502-222-4663

# Anemia of Chronic Kidney Disease

*Cathy E. Langston, DVM, DACVIM (Small Animal)*

## BASIC INFORMATION

### Description

Anemia is a low red blood cell (RBC) count. RBCs carry oxygen to the tissues of the body. If RBC numbers are low, body tissues may be deprived of adequate oxygen.

### Causes

As RBCs age, they are taken out of circulation and replaced with new, younger RBCs. The kidneys make a hormone, erythropoietin, which stimulates the bone marrow to make these new RBCs. As the kidneys fail, they make less erythropoietin, and fewer RBCs are produced to replace the cells that are removed. This failure to replenish RBC numbers creates a slowly worsening anemia. Another cause of anemia in patients with kidney disease is a bleeding ulcer in the stomach.

### Clinical Signs

Anemia often produces signs of tiredness (lethargy), weakness, fast heart rate, rapid breathing, and poor appetite. On physical examination, pale gums, a heart murmur, and weak pulses may be detected.

### Diagnostic Tests

Hematocrit and packed cell volume (PCV) are very similar blood tests that measure the percentage of blood composed of RBCs. These values are low with anemia. The reticulocyte count determines the number of new RBCs being produced. This value is also typically low with anemia from chronic kidney disease. In some cases, bone marrow aspiration is recommended to rule out other causes of anemia.

## TREATMENT AND FOLLOW-UP

### Treatment Options

If stomach ulcers are known or suspected to be causing anemia, treatment is usually recommended with antacids, such as famotidine (*Pepcid*), and the gastric protectant, sucralfate. B vitamin supplements may help the anemia a little.

Blood transfusions immediately increase the PCV and improve signs associated with anemia. In emergency situations, transfusions are the best choice; however, transfused RBCs generally only last few weeks. To sustain an anemic animal long term would require repeated transfusions, and with each transfusion the risk of a transfusion reaction increases, even if blood cross-match tests are performed prior to each transfusion to check for compatibility.

Commercial erythropoietin can be used to replace the natural hormone the kidneys are failing to make. Two forms are available; both are given by injection under the skin (subcutaneous). Erythropoietin (*Epogen, Procrit*) is initially given three times per week until the PCV is normal, then usually once weekly to maintain the PCV. Darbepoetin (*Aranesp*) is initially given weekly and can often be decreased to every other week.

Unfortunately, both of these hormones are made for people. Although they work in animals, the immune system of some animals can recognize them as foreign substances and form antibodies against the drugs. If this happens, the immune system inactivates the hormone that has been injected, as well as any natural hormone the kidneys may still be making. This inactivation makes the anemia worse than it was before hormone shots were started. About 20% of patients on erythropoietin and 10% on darbepoetin develop this immune reaction. Some patients can partially recover from it, but many will be dependent on blood transfusions afterward.

Because of this potential reaction, treatment with hormone shots is usually delayed until the signs of anemia are moderate to severe. Other side effects of hormone shots include high blood pressure (hypertension) and seizures. Despite the possibility of adverse effects, most patients feel much better, are more interactive, and eat more while receiving these injections.

Because RBCs contain iron, iron supplements are needed when the animal is receiving hormone shots. Oral iron pills are available, or monthly iron shots may be administered.

### Follow-up Care

With hormone treatment, weekly rechecks are often scheduled that include a PCV, blood pressure measurement (if available), and reticulocyte count (ideally) until the anemia has improved. The frequency of rechecks can be gradually decreased if the anemia improves.

### Prognosis

Anemia decreases the quality of life of dogs and cats with chronic kidney disease. The combined signs of chronic kidney disease and anemia may cause the animal to feel so poorly that euthanasia is considered. Successful treatment of the anemia often prolongs and improves the quality of the animal's life.

***IF SPECIAL INSTRUCTIONS HAVE BEEN ADDED, THEY WILL APPEAR ON THE LAST PAGE OF THE PRINTOUT.***