

Increased Number of Red Blood Cells (Polycythemia)

Basics

OVERVIEW

- Blood consists of red blood cells (the most numerous cells normally), white blood cells, platelets, and plasma (the liquid portion of blood); each of the blood cells and platelets have ranges for the number of cells or platelets that have been established as being “normal”; in the case of red blood cells, if the red blood cell count is lower than the normal limit for the low end of the range, the pet has “anemia” and if the red blood cell count is higher than the normal limit for the high end of the range, the pet has “polycythemia”
- Polycythemia is caused by an increase in packed cell volume (PCV, a means of measuring the percentage volume of red blood cells as compared to the fluid volume of blood); hemoglobin concentration (hemoglobin is the compound in the red blood cells that carries oxygen to the tissues of the body); and red blood cell (RBC) count above the normal ranges
- Polycythemia is classified as “relative,” “transient,” or “absolute”
- Relative polycythemia—develops when a decrease in the liquid portion of the blood (plasma volume) produces a high PCV, caused by the cellular portion of the blood being a high percentage of the blood volume as compared to the fluid portion and a “relative” increase in circulating red blood cells; usually caused by dehydration
- Transient polycythemia—caused by contraction of the spleen, which puts extra red blood cells into the circulation; this response of the spleen is usually momentary and is a response to stress or release of epinephrine, thus the name “transient polycythemia”
- Primary absolute polycythemia (known as “polycythemia vera”); the focus of this handout—a bone-marrow disorder characterized by the uncontrolled, but orderly production of an excessive number of mature red blood cells; disorder is classed in the chronic myelogenous leukemia spectrum; produces thick (known as “high viscosity”) blood
- Secondary absolute polycythemia—caused by the release of erythropoietin



SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs

- Cats

Mean Age and Range

- Primary absolute polycythemia—primarily older animals

SIGNS/OBSERVED CHANGES IN THE PET

- Vary with the degree of increased number of red blood cells (polycythemia)
- Primary absolute polycythemia—may be gradual onset; may be incidental diagnosis—depression; lack of appetite (known as “anorexia”); low exercise tolerance/weakness; increased thirst and urinations (known as “polyuria/polydipsia”); brick-red tissues (known as “mucous membranes”) and skin; blood vessels at the back of the eye (retina) large; inflammation of the eye portion known as the uvea (known as “uveitis”); sudden blindness; variable degrees of enlargement of the spleen (known as “splenomegaly”) and of the liver (known as “hepatomegaly”), the latter is uncommon

CAUSES

- A *JAK2* mutation has been implicated in polycythemia vera

Treatment

HEALTH CARE

- Primary absolute polycythemia—phlebotomy (procedure in which blood is removed from the body via a vein) is recommended to reduce the number of circulating red blood cells; the amount of blood removed will be replaced with IV fluids to prevent the development of low blood pressure (known as “hypotension”); provides quick relief from signs during a crisis
- Hydroxyurea—may temporarily decrease their red cell count

ACTIVITY

- Depends on severity of the polycythemia
- Excessive exercise should be avoided

DIET

- Normal diet with free-choice water

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Primary absolute polycythemia (polycythemia vera)—hydroxyurea

Follow-Up Care

PATIENT MONITORING

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- Pets being treated for primary absolute polycythemia by chemotherapy—the veterinarian will check the retina, and monitor periodically for changes in PCV and complete blood counts, biochemical profiles that might indicate side effects of the hydroxyurea

POSSIBLE COMPLICATIONS

- Increased red blood cells in the blood leading to sludging of the blood (known as “hyperviscosity”) may occur in pets with absolute polycythemia, especially primary absolute polycythemia (polycythemia vera); hyperviscosity may lead to blood clots (thrombosis), sudden lack of blood supply that leads to death of tissues (known as “infarction”)
- Chemotherapy with hydroxyurea may cause bone-marrow suppression, leading to low red blood cell and low white blood cell counts; low platelet count (known as “thrombocytopenia”); hydroxyurea also may decrease or stop the production of sperm—your veterinarian will discuss side effects further

- Pets with absolute polycythemia can develop iron deficiency as a result of phlebotomy and excess red cell production

EXPECTED COURSE AND PROGNOSIS

- Prognosis in primary absolute polycythemia is guarded; this disease does respond to treatment, but monitoring the pet is important; monitoring the pet for changes in complete blood count (CBC) values and evidence of blood clots, or decreased activity is essential

Key Points

- Identification of the cause or mechanisms responsible for the increase in the number of circulating red blood cells is the major focus in the clinical diagnosis and treatment of polycythemia
- Polycythemia is caused by an increase in PCV, hemoglobin concentration and red blood cell count above the normal ranges
- Polycythemia is classified as “relative,” “transient,” or “absolute”
- Monitor pet for change in activity, weakness, difficulty breathing, or signs of generalized infection
- Your pet's veterinarian will discuss personal safety and handling of chemotherapy drugs if they are prescribed and dispensed for home treatment
- If any concerns arise about your pet's condition, contact the veterinarian