

Leukemia

ABOUT THE DIAGNOSIS

For dogs and cats, as for humans, leukemia is cancer of the bone marrow. Leukemias are malignant, meaning the cancer cells spread to multiple areas of the body, but leukemias are highly variable in their severity. Some leukemias in dogs and cats are devastating, with very little improvement possible despite any medication, whereas others can be controlled with treatment and allow a pet with leukemia to live a happy and comfortable life, sometimes approaching the normal life span.

In cats, a form of leukemia exists that is contagious between cats. This is the feline leukemia virus (FeLV). It is *not* contagious to dogs or other animals, and it is *not* contagious to humans. The virus is swallowed, and it can transform normal bone marrow cells into cancerous, leukemic cells. Cats that contract feline leukemia must be exposed to leukemia virus-infected cats repeatedly or for a prolonged period of time. Therefore, a cat that lives only indoors and is the only cat in the household has a low risk of feline leukemia (though not zero risk—he/she can have been infected around the time of birth), whereas cats that roam outside and/or live with other cats have a higher risk of contracting the feline leukemia virus.

In dogs and cats, normal bone marrow is full of cells that are constantly growing and developing. The cells replace themselves as well as maturing and developing into red blood cells, white blood cells, and platelets. *Leukemia* is an abnormal growth and reproduction of a particular white blood cell type, red blood cell, or platelet. These abnormal cells may be confined to the bone marrow or may be circulating in the peripheral bloodstream, where they can be detected with a routine blood count. If the abnormal cell type is confined to the bone marrow and not circulating in the bloodstream, the condition is called *aleukemic leukemia*.

Leukemia is a broad category of blood cell cancer; there are several different types, each of which “behaves” in its own way in terms of causing illness and symptoms, responding to treatment, and affecting life span. A leukemia’s type is based on the specific blood cell line that has become cancerous. In dogs, the most commonly encountered form of leukemia is *lymphocytic leukemia*. These are cancers of the lymphocyte (a type of white blood cell) lineage. In turn, lymphocytic leukemia is subcategorized as chronic lymphocytic leukemia (CLL) or acute lymphocytic leukemia (ALL) because the behavior and severity is very different for each.

CLL is associated with large numbers of slow-growing, slowly reproducing, small and mature lymphocytes. Leukemia of these small, more mature cells (CLL) generally evolves slowly and is associated with longer survival times (without treatment) and sometimes does not even require treatment upon diagnosis. CLL is sometimes found as a coincidental finding on a routine blood test, with no symptoms of disease or illness. The symptoms and effects of CLL are generally milder than those of many other leukemias, and treatment to make affected animals comfortable and able to do their normal daily activities tends to be more successful for a longer period of time.

Acute lymphocytic leukemia (ALL) is associated with large numbers of fast-growing, quickly reproducing, and immature (blastic) lymphocytes. These large, more immature cells (ALL) tend to grow faster and are associated with shorter survival times, without therapy. However, they tend to respond to chemotherapy quite well, especially at first. While some initial improvement can be expected with treatment of ALL, it tends to return and cause symptoms again more quickly even with ongoing treatment.

Other leukemias (involving nonlymphocytic blood cells, such as neutrophilic leukemia, erythroleukemia, and others) are much less common than those described above. They often carry a poor outlook for recovery, but the exact specifics vary from one animal and one subtype of these other leukemias to another.

With any type of leukemia or even when leukemia is suspected but not confirmed, tests that will need to be performed include a routine blood screen (complete blood count and serum biochemistry profile), urinalysis, and a bone marrow aspiration under general anesthesia. This procedure is essential: it identifies leukemia that is confined to the bone marrow (aleukemic leukemia) and helps determine the type and subtype of all leukemias.

Identifying leukemia and knowing how to treat it can be helped very substantially with the participation of a veterinarian specialized in veterinary cancer medicine. You should strongly consider seeing one of these specialists, called Diplomates of the American College of Veterinary Internal Medicine—Specialty of Oncology, for the latest available treatments and to get the best informed answers to your questions. You can discuss referral to one of the Oncology Diplomates in your area with your veterinarian (directories: www.acvim.org and www.ecvim-ca.org).

LIVING WITH THE DIAGNOSIS

Many pets with CLL or small cell lymphocytic leukemia live for extended periods of time (months, even years) without any treatment, prior to onset of symptoms. Once symptoms like poor appetite, weight loss, increased drinking, increased urination, lethargy, bleeding, paleness, and/or enlargement of peripheral lymph nodes occur, pets with CLL should begin to receive treatment. This generally consists of oral anticancer medications that can significantly slow and reduce the cancer burden. Uncommonly, but in some individual dogs that are sensitive to them, the medications can cause similar symptoms of poor appetite and weakness or increase the risk of secondary infection. For this reason and as a precaution, your veterinarian should recommend recheck examinations on a regular basis until a state of control and resolution of symptoms has occurred. The rechecks help to identify whether an early degree of intolerance to the medication might be happening, in which case the medications can be decreased or changed.

Pets with ALL require a more intensive, rotating drug plan if treatment is desired. Not all pets with ALL will acquire remission (resolution or reduction in symptoms), but many do respond very positively and very quickly. Pets with ALL have very short survival times without treatment.

TREATMENT

The goal of treatment is to improve and restore good quality of life. Successful treatment in this way will also extend your pet’s life by reducing the cancer burden.

The most effective way of treating pets with leukemia is to give anticancer medications in the form of injections and oral tablets at home. This form of treatment is called chemotherapy, but unlike chemotherapy in human cancer patients, chemotherapy in animals is better tolerated. Hair falling out is very rare, as are nausea and vomiting.

The goal is to give anticancer medications in amounts and timings that destroy as many of the cancer cells as possible, while leaving healthy tissue cells unharmed. A good, safe, effective chemotherapy plan (protocol) is tailored to your pet’s characteristics,

including features of the leukemia observed microscopically on specimens, other test results, and response to treatment.

In human beings, bone marrow transplantation is widely used for treating leukemia, but it has not been successful in past attempts in veterinary medicine and is not yet part of the standard of care in dogs or cats.

DOs

- Understand the important steps in treating any dog or cat thought to have leukemia:
 - Confirmatory testing—is it leukemia or not?
 - Once leukemia is confirmed, a decision on treatment is needed (Try it to see if it works, or not at all? If going ahead with treatment, will it be complete—including chemotherapy—in order to try for the greatest chance of beating the cancer back, or will it be minimal in order to provide some short-term benefit with the least expense and risk?).
 - If relapse occurs and the leukemia comes out of remission, how long to continue with treatment?
 - These questions are essential and you should not hesitate to discuss them with your veterinarian both initially and throughout the period of treatment, if you choose to pursue one.
- Realize that chemotherapy is different in humans versus pets and that dogs and cats do not routinely have the severe side effects that humans do.
- Realize that chemotherapy is not an all-or-none phenomenon. It is all right to start chemotherapy and see how it goes, because improvement is virtually always seen in the 1-2 weeks after starting (if there is going to be improvement at all). If there is no improvement early on, the likelihood of successful long-term treatment is reduced significantly, but some comfort may come from knowing that all possibilities have been tried.
- Your pet's quality and quantity of life are dependent on you. You must administer medications, follow up as directed by your veterinarian, and be careful and aware of side effects. Your participation in treatment can be critical.
- Decide in advance what standards would influence you to decide that it is not worth continuing treatment and that it may be most humane to request euthanasia for your pet. These reference points may change somewhat over time but are useful ways of avoiding emotional or fear-driven decisions in "the heat of the moment." Deciding these standards in advance can help enormously if a situation arises that requires you to make difficult decisions regarding continuing treatment versus euthanasia.
- Realize that, like most family members caring for dogs or cats with leukemia, veterinarians are aiming, above all, for a good quality of life for their patients. This means trying to find the best possible balance between continuing with treatment if there is hope, and not prolonging the inevitable, or risking suffering, if treatment is not working. There are many factors for deciding whether to continue treatment or stop; some veterinarians believe that if 1) a problem is incurable and not responding to treatment, *and* 2) a pet's vital functions (eating, or breathing comfortably, or taking care of urinating and defecating on his/her own) are not fully self-controlled, *and* 3) the pet has lost the characteristic feature (be it a look in the eye, or a fondness for a favorite toy, or a favorite activity) that makes him or her himself/herself, then euthanasia should legitimately be considered. You should be able to count on discussing these crucial and important questions with your veterinarian.

DON'Ts

- Do not give up because of one bad day, but rather, be aware of overall trends. Have there been several bad days lately? Does this one bad day make you realize that your pet has not been himself/herself for quite some time? If so, then there is reason to question whether to continue, but if it is a single "off" day, things may be totally different a short while later.

WHEN TO CALL YOUR VETERINARIAN

- Recurrence of symptoms (e.g., decreased appetite, weakness, pallor, excessive drinking, excessive urination, fever, vomiting, diarrhea, or weight loss) should be discussed with your veterinarian. These may represent symptoms of leukemia itself or symptoms of adverse reaction to treatment, and the difference is crucial: If it is leukemia itself, the disease may be advancing and some consideration should be given to additional or other treatments, whereas if it is intolerance to medication the treatment should be reduced.
- Your veterinarian should describe specific symptoms and side effects based on drugs prescribed and/or given in the hospital. If not, you should feel comfortable calling and requesting this information.

SIGNS TO WATCH FOR

- Decreased appetite, excessive drinking, excessive urination, fever, pallor, vomiting, diarrhea, and weight loss. Some of these symptoms may be expected as a result of medications (e.g., prednisone, furosemide), so be sure to ask your veterinarian about whether to watch for these as expected medication-related effects or symptoms worthy of concern.

ROUTINE FOLLOW-UP

- Generally once per week for the first several visits, then more widely spread out depending on the particulars of your pet's situation and response to treatment.
- Usually, with chemotherapy, every visit begins with a blood test. This is an important precaution that looks for the early signs of intolerance to chemotherapy. If the blood test results are fine, then the treatment can proceed, but if not, the veterinarian may recommend that chemotherapy be reduced in amount, delayed, or skipped altogether in order to let the body process all of the previous chemotherapy and be ready for the next treatment. In other words, the prechemotherapy blood test is important for every visit since it is a precautionary measure.

Practice Stamp or Name & Address