



Lymphoma of Dogs and Cats

This handout and accompanying webinar answer some of the most commonly asked questions about lymphoma in dogs and cats.

What is cancer?

Cancer is defined as uncontrolled cell growth. It is important to remember that even though cancer is a *genetic* disease, and possibly also a metabolic one, it isn't always an *inherited* disease. Cancer arises when changes in a cell's genetic code lead to uncontrolled cell growth. Individuals may have an inherited *tendency* toward developing these changes, but other factors (such as the environment) also play a role in cancer's development.

What are the six characteristics of cancer?

Cancers share six characteristics that define what cancer is and describe how it generally behaves. These characteristics include the following:

1. Cancer cells have sustained growth, meaning they grow for longer periods of time than normal cells.
2. Cancer cells don't respond to normal anti-growth control signals.
3. Cancer cells are resistant to death, so they live longer than normal cells.
4. Cancer cells can continuously divide, whereas normal cells have a limited number of times they can divide before they die.
5. Cancer cells are effective at making blood vessels, and by doing so, they can obtain nourishment and compete with normal cells for nutrients.
6. Cancer cells can invade surrounding tissues and spread.

What are lymphocytes?

Lymphocytes are a type of white blood cell, part of the body's defense system against infections and cancer cells. There are two major types of lymphocytes: B-cells and T-cells. B-cells make antibodies, and T-cells kill abnormal or infected cells. T-cells also provide "help" to other cells of the immune system.

Where are lymphocytes located?

Lymphocytes are located throughout the body, primarily in the lymph nodes of the immune system. They also circulate in the bloodstream and often are found in the liver and spleen.

What is lymphoma?

Lymphoma is one of the most common types of cancer in both dogs and cats. In this type of cancer, the lymphocytes multiply uncontrollably. The increased number of lymphocytes can lead to lymph node or organ enlargement, or to increased numbers of lymphocytes in the bloodstream and bone marrow. Lymphoma also can affect the skin, although this is rare.

Who gets lymphoma?

Lymphoma can affect any breed or age of dog or cat. It more typically affects middle-aged dogs of either sex, and certain breeds may have an increased risk, including boxers, mastiffs, basset hounds, St. Bernards, Scottish terriers, airedales and bulldogs. Cats of any age can develop lymphoma, although different types predominate in different age groups.

How can I tell if my pet has lymphoma?

Lymphoma can be difficult to diagnose because its clinical signs resemble those of many other diseases. Because lymph nodes tend to be located in areas not easily accessible and lymph node enlargement can be subtle, it is difficult for most pet owners to actually feel a lump or enlargement. Lymphoma is not a painful disease in its early stages, but often owners will bring their pets to their veterinarian because their pet “isn’t feeling well.”

How is lymphoma diagnosed?

Lymphoma is typically diagnosed in one of three ways. Abnormal lymphocytes may be noted in the blood. Aspiration of enlarged lymph nodes or internal organs may reveal clusters of abnormal lymphocytes. The disease might also be noted in biopsies of enlarged lymph nodes or internal organs. If the skin form of lymphoma is suspected, skin biopsies would be indicated.

What is staging and why is it important?

Cancer staging is a way of evaluating the extent and severity of a patient’s cancer in order to determine the prognosis and to guide treatment. Staging involves evaluating the amount of cancer present, looking for evidence of tumor spread and evaluating whether the patient is feeling sick from the tumor itself. All these factors together are used to determine the stage of cancer.

Canine lymphoma is classified into one of five stages:

- Stage I** – involvement limited to a single site (usually a single lymph node)
- Stage II** – involvement of several lymph nodes in one area
- Stage III** – generalized lymph node involvement
- Stage IV** – liver and/or spleen involvement
- Stage V** – involvement of bone marrow and blood

The staging system for cats reflects their different forms of lymphoma. It also is divided into five stages:

- Stage 1** – involvement of one lymph node (includes solitary chest tumors)
- Stage 2** – single tumor with local lymph node involvement, or two or more tumors on the same side of the diaphragm, or a solitary gastrointestinal tumor
- Stage 3** – two tumors on opposite sides of the diaphragm, or nonresectable abdominal disease, or any spinal tumor
- Stage 4** – Stage 1 to 3, plus liver and/or spleen affected
- Stage 5** – Stage 1 to 4, plus involvement of bone marrow, nervous system or both



Each stage also is given a substage designation of either “a” or “b.” A dog or cat is considered to be substage “a” if lymphoma is diagnosed, but the pet has no clinical signs. Substage “b” is used to indicate a pet that is ill due to the disease.

How is lymphoma treated?

Because most lymphomas are not detected until they are Stage 3 or higher, they require chemotherapy to treat the whole body. The type of chemotherapy given depends on several factors, including the stage and substage of disease, the presence of any preexisting conditions and the overall prognosis and likelihood of success. Statistics suggest that if left untreated, most dogs will die of lymphoma within four to six weeks. For cats, the survival time without treatment varies greatly. Cats with more advanced lymphoma have a shorter survival time than dogs, but cats with low-grade lymphoma tend to live for longer periods.

How does chemotherapy work?

All chemotherapeutic agents work by interfering with the mechanisms involved in cell division and growth. Agents have different cellular targets, so combining different agents has been shown (in most cases) to be more effective in killing cancer cells than administering a single agent.

Many chemotherapeutic drugs have been studied for the treatment of lymphoma in dogs and cats. Several well-established protocols commonly are used in veterinary medicine to treat the various stages of disease, and more agents are continually being studied. Which chemotherapy protocol selected for a patient depends on many of the factors discussed above, as well as financial and time considerations.

Before embarking on any treatment protocol, it is important for the pet owner and their veterinarian to agree upon a common treatment goal. For some pets this might simply encompass providing as much comfort and quality time as possible; for other pets, longer remission periods may be a reasonable chemotherapeutic goal.

What side effects are associated with chemotherapy?

The side effects associated with chemotherapy depend on the type of drug administered. Many chemotherapy toxicities can be anticipated, and appropriate monitoring of the patient can help alleviate adverse signs. Modifications to the treatment protocol can be made based on a patient’s reaction to medication.

In general, pets tend to do well with chemotherapy. They rarely have the significant hair loss often seen in people undergoing chemotherapy. Dogs and cats can experience some nausea and loss of appetite while receiving chemotherapy, but this often can be effectively treated with other medications.

Other side effects seen with chemotherapy drugs include diarrhea, damage to internal organs (liver, kidney and heart in particular), and severe tissue irritation if a medication leaks from a blood vessel. Again, many of these problems are avoidable or manageable.



What is the prognosis for dogs with lymphoma?

Prognosis for dogs with lymphoma depends on several factors. Two factors that studies have indicated as being particularly important are whether the lymphoma is of B-cell or T-cell origin and the substage classification. T-cell origin tumors have a poorer prognosis, as do substage “b” tumors. Dogs with higher stages of disease also tend to have a worse prognosis, although there is some variation. The body site involved can also influence prognosis (for example, a Stage III lymphoma in the nervous system can be worse than Stage III disease in lymph nodes). Although cures are less than 10 percent, many patients can attain complete remission of disease with excellent quality of life for prolonged periods of time.

What is the prognosis for cats with lymphoma?

The prognosis in cats also is influenced by tumor stage and substage. Cats with low-grade disease tend to live longer than dogs undergoing similar treatment, sometimes experiencing survival of two or more years with an excellent quality of life. Unfortunately, cats with intermediate and high-grade lymphomas tend to do poorly even with therapy. Average survival time for these more advanced cancers is only six months.

What is Morris Animal Foundation doing to help?

Morris Animal Foundation has invested more than \$4 million in lymphoma-related research during the past 20 years, with the bulk of funding occurring in the past 13 years. Several studies are ongoing, and the most common types of projects funded address advances in unique cancer treatments, identification of testable genetic markers, and development of diagnostic tests. One ongoing study looking at the use of viruses to enhance anti-tumor activity has reached a clinical trial phase. Other studies completed in the last four years have elucidated some of the metabolic pathways used by cancer cells that may be excellent targets for anti-cancer therapy. One completed study found a promising gene alteration in dogs with lymphoma might be exploited as a diagnostic test. Several other large studies are in progress looking for additional genetic markers of canine lymphoma. To learn more about our current studies, please visit morrisanimalfoundation.org.