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## Lymphoma

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### What is lymphoma?

The lymphomas (malignant lymphoma or lymphosarcoma) are a diverse group of cancers that originate from a type of white blood cell called a *lymphocyte*. They are one of the most common cancers diagnosed in dogs and cats. This cancer usually arises in lymph tissues such as lymph nodes (lymph glands), spleen, and bone marrow; however, it can arise in almost any tissue in the body including the skin, the brain, spinal cord, bones, heart, or intestines. In the cat, it is most commonly found in the intestinal tract. Lymphoma can occur in any breed. Middle-aged to older dogs and cats are most commonly affected; however, young cats that carry the feline leukemia virus may also develop lymphoma. In most cases, the cause of lymphoma is unknown; however, a weak association with herbicide (weed killers) is known in the dog and the feline leukemia and immunodeficiency virus can occasionally cause the disease in cats.

### What are the signs of lymphoma?

Because lymphoma can affect any tissue in the body, symptoms can be vague and may reflect the organ that is involved.

Signs of lymphoma can include the following:

- Generalized lymph gland swelling and enlargement (most easily felt under the jaw, in front of the shoulder and behind the knee)
- Loss of appetite
- Weight loss
- Vomiting and/or diarrhea
- Lethargy
- Excessive drinking
- Skin lumps
- Neurologic signs

Most dogs with lymphoma still feel fine and the glandular enlargements are often noticed incidentally by the owner, the groomer, or the veterinarian during routine examination. In the cat, most cases involve the intestinal tract, so diarrhea and weight loss are the most common symptoms in that species.

### **What tests are needed?**

In most cases, a needle aspirate or biopsy of the affected organ(s) is required to make the diagnosis. This usually involves a biopsy or removal of a lymph gland in dogs, as that is the most common organ involved. In cats and dogs with the intestinal form of the disease, biopsies may be obtained through the use of a fiberoptic scope or an abdominal exploratory surgery.

In addition to establishing a diagnosis based on a biopsy, several other tests are recommended prior to treatment. These tests are used to establish the extent of the cancer (i.e., clinical stage; how advanced the cancer is) and to more accurately determine the prognosis in each individual. Certain test results are known to predict whether a particular dog or cat is likely to respond to therapy.

For example, determining if a pet has high blood calcium, bone marrow involvement, and/or tumors in the front part of the chest are all helpful in predicting outcome. Therefore your veterinarian will likely recommend blood tests, a bone marrow aspirate, and chest X-rays as part of the work-up. Also, a special type of analysis of the biopsy, called *immunophenotyping*, is recommended in dogs to determine whether the cancerous lymphocyte is a “B-cell” or a “T-cell” type. This is important because dogs with T-cell disease (approximately 20% to 25% of cases) tend to do poorly when compared with dogs with B-cell disease.

Your veterinarian will also ask a pathologist to determine if the lymphoma is a “high” or “low” grade subtype. This will help determine how aggressive the treatment will be. Additionally, blood tests to assess the overall health of the pet are important because the disease usually occurs in older animals that may have complicating diseases such as diabetes, kidney, heart, or liver disease.

### **What treatment is needed?**

The type and extent of treatment varies greatly based on several factors including the extent (i.e., stage) of disease, the organs involved, the cell type involved and the caregiver/guardian’s wishes with regard to cost, time commitment, and level of comfort regarding the potential to tolerate side effects.

In general, most pets with lymphoma have involvement of multiple glands and/or multiple organs, so it is called “multicentric” lymphoma. Therefore, most treatment types available involve medications that go to all parts of the body (i.e., chemotherapy). The gold standard of care for multicentric lymphoma is a combination of four or five chemotherapy drugs given into the vein in an alternating fashion either weekly or every other week. This will usually result in a remission (absence of disease) in 90% of dogs and 65% of cats within 2 to 4 weeks. Treatment is normally continued for 3 to 6 months depending on the protocol used. After the treatment is stopped, dogs and cats are checked monthly for recurrence of their cancer.

Alternatives to multi-drug chemotherapy protocols exist. These usually involve the use of just one of the drugs used in combination protocols. In general, these tend to be less effective but also require fewer visits to the veterinarian, are less costly, and have less chance for side effects. Clients who do not wish to pursue chemotherapy should consider a course

of an oral corticosteroid medication called *prednisone*. Although this may help some dogs, the response to prednisone tends to only last 1 or 2 months. Pet owners should be aware that prior usage of prednisone can make chemotherapy less effective in the dog.

In rare cases where the lymphoma only involves a single site (e.g., one skin lesion, bone, nasal cavity), then whole-body chemotherapy may not be necessary and local treatment by surgery and/or radiation therapy may be the best treatment. It should be remembered, however, that the disease may eventually return in a “multicentric” form months or years down the road. However, it is still recommended to hold off with chemotherapy until it is proven to involve multiple sites.

In the less common forms of low-grade lymphoma, a less aggressive form of oral chemotherapy is often recommended. This also applies to certain forms of lymphoma that involve the skin.

### **What is the prognosis?**

Without treatment, dogs and cats with multicentric lymphoma live an average of 6 weeks. This, of course, varies greatly with the type and extent of lymphoma. Approximately, 90% of dogs and 65% of cats with multicentric lymphoma will respond to multi-drug chemotherapy. The average lifespan for a dog treated this way is 1 year, with approximately 25% living 2 years or longer. In the cat, the average survival with treatment is 7 months; however, if a complete response is achieved approximately one third will live 2 years or longer. This is an average, and some dogs and cats live much longer (even cures in 5% of cases), whereas others, unfortunately, have resistant cancers and respond for shorter periods of time or do not respond at all.

Individual outcomes can be better predicted if the cell type, grade, organ involved, and stage are known. Using single-agent chemotherapy can result in remissions; however, the length of the remission is shorter than in multi-drug protocols. For those clients who choose simple steroid therapy (e.g., oral prednisone), responses tend to be only a month or two in length.

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