



Canine Lymphoma

Lymphosarcoma (lymphoma) is a relatively common cancer of lymph cells (called lymphocytes). Lymphocytes are white blood cells and are part of the body's lymphatic system, which is a circulatory system as extensive in the body as the network of veins and arteries. The lymphatic system's job is to filter dead cells, bacteria, and debris and to maintain fluid balances among tissues. Lymph cells are also part of the immune system, and they serve to present potential foreign invaders to the immune system so that the body can mount an immune response. Lymphocytes circulate in the blood and through the lymphatic system. Lymph nodes are aggregates of lymphocytes found in particular locations, and lymph tissue is found in many organs, such as the spleen, liver, gastrointestinal system, and skin.

While lymphoma most commonly arises in the lymph nodes, it can arise in different organs in the body. And while it can be a slow-growing, indolent disease, lymphoma in dogs is most often a rapidly progressive systemic disease and fatal if left untreated in few weeks to a few months.

Cancer is usually caused by alteration of a stem cell that further causes unchecked and inappropriate cell division and growth. "Malignant" cells are altered or mutated in ways that allow them to escape the normal process of cell death. They accumulate inappropriately into the growths we know as tumors. Certainly genetics play a role, and certain breeds are more likely to be diagnosed with lymphoma than others. Specific mutations and lymphoma subtypes are associated with breed.

Breeds at increased risk of lymphoma include Boxers, German Shepherds, Retrievers, Scotties, Pointers, and Rottweilers. Environmental and viral factors have also been considered, but definitive evidence is lacking. In cats, second-hand smoke is known to play a role. Most likely, there are multiple contributing factors, which is why it is hard to pinpoint a single causative factor.

Lymphocytes are heterogeneous. Two main subgroups are B- and T-cells. Even though lymphoma sounds like one disease, there are many subtypes that have different outcomes and behaviors. Most of the time in dogs, we still treat most subtypes similarly, but this may change in the future.

Lymphoma can also present in different ways. The most common presentation is a dog whose peripheral lymph nodes are grossly enlarged. Clients come in because they feel “lumps,” often under the chin. Usually, the lymph nodes are not painful and the patient is not ill. The most commonly noted lymph nodes are located under the jaw, in front of the shoulder blades, in the arm and leg “pits,” and behind the knees. Internally, the liver, spleen, and bone marrow are sometimes involved. Less commonly, the skin, kidneys, lungs, brain, intestines, or other organs are involved.

Most dogs with lymphoma are not ill or in pain. The lymph nodes are large but not painful. However, some patients become ill as a consequence of the disease. Signs might include vomiting, weight loss, diarrhea, lethargy, appetite loss, increased thirst, weakness, abnormal behavior, or difficult breathing. These signs often depend on the location of the mass but may also be from specific factors released by tumors as well.

Lymphoma can often be diagnosed by fine needle aspirate alone. Some cases require biopsy or additional diagnostics. Once diagnosis is confirmed, additional staging tests are often performed. These tests are used to determine overall health, assess fitness for treatment, and establish a baseline stage of disease.

Diagnostics can include blood work (cbc, serum chemistry screen, other), urinalysis, 3-view chest x-rays (radiographs) or CT scan, abdominal ultrasound, and cytological evaluation of cells from potentially affected sites, such as the liver, spleen, intestines, or bone marrow. Tests can then be re-checked in the future to determine success of treatment and guide us to know when it’s safe to stop treatment. Additional diagnostics include flow cytometry, PARR, and subtype determination by biopsy. These provide additional information about the tumor and treatment outcome. They may eventually be used to guide treatment making decisions.

Lymphoma is a systemic disease and usually presents in multiple sites. Surgery therefore is not usually the recommended treatment. Lymphoma is however particularly sensitive to chemotherapy. Standard-of-care treatment is weekly treatment with a sequentially rotating cycle of drugs.

Eighty-five to 90% of all dogs respond to treatment and go into a complete or partial remission. This means that detectable evidence of cancer reduces significantly or disappears. Most of these patients achieve clinical remission, which means all evidence of disease disappears. It does not mean the patient is cured. Below a certain number of cells, cancer is hard if not impossible to detect even with modern diagnostics. The residual cells remain viable and can take root and grow again. This is one reason why we continue treatment even beyond the point when all visible cancer is gone.

For patients who don’t achieve a clinical remission, we try different protocols, but often

these patients have inherently drug-resistant disease. For all patients treated with chemotherapy, only about 15% are cured. However, the high life quality achieved during and after treatment often makes the undertaking worthwhile.

Why is the cure rate so low?

We treat our veterinary patients less intensively than doctors treat humans. Additionally, studies show most dogs have an aggressive form of lymphoma, which also makes their disease harder to treat. Overall, we err on the side of providing a high quality of life to our patients. There are more aggressive treatments now available. These involve higher treatment doses, bone marrow transplants, or half body irradiation. These can be performed but the owner must be well aware of the costs and risks.

When patients achieve complete remission, it's always possible they will be cured, but only time will tell. For most, they maintain remission and good quality of life. This is, on average, for 8-10 months. When a patient comes out of remission (relapses), a rescue protocol is recommended. This may include the same or different treatments depending on the timing of the relapse.

Length of remission and survival are variable and based on many factors. Predictive factors include:

- (1) Sub-stage – how sick the patient is at the time of diagnosis. Sicker patients usually do much worse.
- (2) Bone marrow involvement – why some patients still do well with bone marrow involvement, it can be an indication that they patient may not do as well.
- (3) T versus B cell status – while this is also not a hard and fast rule, T cell lymphomas tend to do worse and not respond as well to treatment as B cell lymphomas.
- (4) Behavior – fast growing, aggressive tumors (most of them are) tend to do worse long term than slow growing, less aggressive tumors. Survival is, on average, 1 to 1.5 years. If a patient completes treatment protocol and remains disease free even for a short period, they will usually achieve a good second remission, and survival is often 1.5 to 2 years or longer.

Treatment schedule depends on many factors. Typically, we treat for 4 to 5 months with a protocol that includes several different drugs (L-asparaginase (Elspar), Vincristine, Cytosar and Adriamycin) given on a weekly basis. Treatments are cycled to reduce the chance that tumor cells become resistant to any one treatment and to reduce the risk of side effects. Different drugs are given different ways. Some are given intravenously (in the vein), subcutaneously (under the skin), or orally (by mouth). If there are drugs to be given at home, instructions will always be provided.

What are the risks?

Most dogs tolerate chemotherapy well with minimal-to-moderate side effects. Moderate effects are self-limiting effects that can be treated or prevented at home with anti-nausea or anti-diarrheal drugs. Side effects might include nausea (salivating, licking lips, turning away from food), decreased appetite, lethargy, diarrhea, infection, or blood in urine. Serious side effects are seen in about 5% of patients. These are effects that may cause a patient to be hospitalized. This is no one's goal. However, some patients are uniquely sensitive. Ill patients or those with large tumor burden are at greater risk. Most do very well, and some are even perkier on treatment. It is usually worth the risk of treatment.

What does this mean to you, the owner?

The first day is usually the longest and most expensive. Diagnostic tests are run and evaluated. The first treatment is given. After this, treatment is administered almost weekly though some treatments can be administered by you at home. Visits are approximately every other week. Adherence to a set schedule is best for the patient and overall outcome. Delays can give tumors a chance to grow.

Diagnosis is stressful but best done sooner rather than later. Treatment is also best started early. Many owners fear treatment because they do not want to make their pet sick. We don't want to do this either. Our recommendations are based on weighing the risks and benefits of treatment versus the no treatment. Without treatment, average life expectancy is 1 to 2 months. During this time, a patient's life quality declines as the tumor burden increases until a point where life quality is absent. The hope of chemotherapy is not to diminish quality of life but to improve it and keep this scenario at bay for as long as possible. We recommend treatment only if risks outweigh benefits as we would for our own pets.

Treatment is a personal decision to be made by a family and owner in the best interest of a beloved pet. Our goal is to help make that choice an educated, compassionate, and informed one both for you and your pet.