

Lymphoma in Dogs
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Lymphosarcoma (lymphoma) is one of the most common cancers diagnosed in dogs. It is a cancer of a type of immune system cells (lymphocyte) and lymphoid tissues (present in many places in the body, including the lymph nodes, spleen, gastrointestinal tract and bone marrow). Lymphoma typically afflicts middle-aged to older dogs, though dogs of any age can be affected. Certain breeds (Boxers, German Shepherds, and Golden Retrievers, for example) may be more likely to develop this type of cancer. In many cases, the exact cause of lymphoma in an individual patient is unknown.

Lymphoma can affect many different areas of the body, including the external lymph nodes (multicentric disease), internal organs, such as the spleen, liver, kidneys, and gastrointestinal tract, the skin, and other sites, such as the bone marrow, mediastinum (front portion of the chest), central nervous system, heart, and lungs. Multicentric disease is the most common form of lymphoma encountered in dogs. Some dogs do not feel sick or exhibit only mild signs of illness at the time of diagnosis, while others may experience more marked clinical signs, such as weight loss, nausea or vomiting, diarrhea, excessive thirst and urination, weakness, or difficulty breathing. In many cases, the only noticeable sign of disease is enlargement of the lymph nodes under the neck, in front of the shoulders, and/or behind the knees.

Diagnosis/Initial Evaluation

A complete evaluation of a dog suspected of having lymphoma involves obtaining a needle aspirate or biopsy of the affected tissues and further diagnostics to determine the extent of tumor in other areas of the body (chest x-rays, abdominal ultrasound, +/- bone marrow aspiration). A test on your dog's tumor sample to determine whether it is a T-cell or B-cell lymphoma is also part of this assessment. Blood work (complete blood count and chemistry panel) and urine sampling are typically performed at the initial visit and provide important information regarding a patient's overall health and ability of the patient to handle treatment.

Treatment and Prognosis

General: Lymphoma is a systemic disease and is treated as such. The mainstay of treatment for lymphoma is chemotherapy. The 'gold standard' treatment for dogs with multicentric lymphoma consists of a multi-agent, CHOP-based chemotherapy protocol incorporating several injectable and oral drugs (L-asparaginase, vincristine, Cytoxan, prednisone, and doxorubicin), given on a more-or-less weekly basis for a period of several months. Each drug works to kill the lymphoma cells in a different way, and the drugs are alternated to prevent or delay the onset of lymphoma cell resistance and reduce the incidence of side effects. These protocols can be modified, and single-agent protocols can be used in cases of patients with specific medical conditions or where there are practical or financial limitations.

Side effects from chemotherapy: These include gastrointestinal upset (nausea/vomiting, loose stools/diarrhea, inappetence), lethargy, hair loss in some breeds, and bone marrow suppression (typically a decrease in the white blood cell count, which can predispose to the development of infections). Gastrointestinal side effects, when they occur, generally arise within 3-5 days post-treatment. Most are mild and/or self-limiting, and can be managed with oral medications at home. It is uncommon, though possible, for patients to experience severe side effects secondary to chemotherapy

necessitating hospitalization for more intensive supportive care (intravenous antibiotics and fluid therapy). Individual chemotherapy drugs can have unique additional side effects which your oncologist will discuss with you at the time of treatment. Recheck examinations and blood work are performed regularly during treatment to ensure that dogs are tolerating and responding to their protocol well, and that it is safe to proceed with subsequent treatments. Adherence to the treatment protocol and avoiding unnecessary treatment delays is important for optimal outcome.

Response to treatment and prognosis: Most dogs with multicentric lymphoma that are treated with a multi-drug (CHOP) protocol typically respond well to chemotherapy with 80-90% of them achieving *clinical remission*. A remission, is *not* a cure, but rather represents the temporary disappearance of clinically detectable cancer. Relatively few dogs are truly cured of their lymphoma with treatment. The majority relapse at some point, at which time they may be re-treated with chemotherapy, so-called rescue chemotherapy. Several other drugs may be used in this phase of the treatment. In general, the duration of these second and other subsequent remissions tend to be shorter than the first remission. Each patient is an individual, and survival times vary depending upon a multitude of factors, including the presence of certain prognostic factors at diagnosis (including the specific type of lymphoma (B or T cell) and how a patient is feeling at diagnosis), as well as a patient's response to therapy.

The average survival for canine lymphoma patients with multicentric disease who are treated with chemotherapy is approximately one year. The prognosis for patients with lymphoma in other sites is more variable.