

## Canine Lymphoma – Frequently Asked Questions by Pet Owners

### What is lymphoma?

The term “lymphoma” describes a diverse group of cancers in dogs that are derived from white blood cells called *lymphocytes*. Lymphocytes normally function as part of the immune system to protect the body from infection. Although lymphoma can affect virtually any organ in the body, it most commonly arises in organs that function as part of the immune system such as the lymph nodes, spleen, and bone marrow. By far the



most common type of lymphoma in the dog is *multicentric lymphoma*, in which the cancer is usually first noticed in lymph nodes. The photo above shows a dog with multicentric lymphoma. Note the swollen mandibular lymph node (white arrow) under the jaw.

Other common lymphomas in dogs include *cutaneous lymphoma* (lymphoma of the skin), *alimentary* or *gastrointestinal lymphoma* (lymphoma of the stomach and/or intestines) and *mediastinal lymphoma* (lymphoma involving organs within the chest, such as lymph nodes or the thymus gland).

### What causes lymphoma in dogs?

Unfortunately, the cause of lymphoma in dogs is not known. Although several possible causes such as viruses, bacteria, chemical exposure, and physical factors such as strong magnetic fields have been considered, the cause of this cancer remains obscure. Decreased function of the immune system has been implicated in the development of canine lymphoma and is a known risk factor for the development of lymphoma in humans.

### What are the most common symptoms of canine lymphoma?

The most common initial symptom of multicentric lymphoma in dogs is firm, enlarged, non-painful lymph nodes. The most easily located lymph nodes on a dog's body are the *mandibular lymph nodes* (under the jaw) and the *popliteal lymph nodes* (behind the

knee). Other common symptoms include loss of appetite, lethargy, weight loss, swelling of the face or legs (*edema*), and occasionally increased thirst and urination. The top photo on the left shows a dog with edema of the left rear leg. This is caused when a swollen lymph node blocks the normal drainage of fluid from the leg.

Cutaneous lymphoma tends to appear first as dry, flaky, red, and itchy patches of skin anywhere on the body. As the disease progresses, the skin becomes moist, ulcerated, very red, and thickened. Masses in the skin can also occur with cutaneous lymphoma. Cutaneous lymphoma may progress slowly and often has been treated for several months as an infection or allergic skin disease before a diagnosis of lymphoma is made. Cutaneous lymphoma may also appear in the mouth, often affecting the gums, lips, and the roof of the mouth. Cutaneous lymphoma in the mouth is often mistaken for periodontal disease or gingivitis in its early stages. The bottom photo on the left shows a dog with cutaneous lymphoma in its mouth. Note the very red gums and the ulceration on the roof of the mouth.

Dogs with gastrointestinal lymphoma usually have symptoms such as vomiting, watery diarrhea, and weight loss. The diarrhea is often very dark in color and foul-smelling.

Dogs with mediastinal lymphoma typically have difficulty breathing. This may be due to the presence of a large mass within the chest or due to the accumulation of fluid within the chest (*pleural effusion*). Affected dogs may also show swelling of the face or front legs as well as increased thirst and urination.

### **How is canine lymphoma diagnosed?**

The best way to diagnose lymphoma is to perform a biopsy. Biopsy simply means removing a piece of lymph node or other organ affected by cancer and can be achieved by several methods. The most common methods for lymph node biopsy are Tru-cut needle biopsy, incisional wedge biopsy, or removal of an entire lymph node (excisional biopsy). The larger the biopsy sample, the better the chance for an accurate diagnosis of lymphoma.

Dogs are placed under heavy sedation or general anesthesia to perform a biopsy. Although discomfort associated with this procedure is typically minimal, we often prescribe oral pain medication afterwards just to be sure your dog is comfortable.

### **Are any other diagnostic tests required for dogs with lymphoma?**

In addition to biopsy, we recommend several *staging tests* for dogs with lymphoma. The purpose of the staging tests is to determine how far the lymphoma has spread throughout your dog's body. In general, the more places the lymphoma has spread to, the poorer the dog's prognosis. However, dogs with very advanced lymphoma can still be treated and experience cancer remission. Staging tests also help us assess whether your dog has any other conditions that may affect treatment decisions or overall prognosis. The staging tests we typically recommend include blood tests, a urinalysis, x-rays of the chest and

abdomen, an abdominal sonogram, and a bone marrow aspirate. Organs that appear abnormal on sonogram can be sampled with a small needle (*fine needle aspirate*) to confirm the presence of lymphoma.

### **How is canine lymphoma treated?**

The most effective therapy for most types of canine lymphoma is chemotherapy. In some cases, surgery or radiation therapy may also be recommended. There are numerous chemotherapy treatment protocols for dogs with multicentric lymphoma. As discussed below, most dogs with lymphoma have regression of their cancer with treatment, and side effects are usually not severe. Currently, the protocols that achieve the highest rates of remission and overall survival involve combinations of drugs given over several weeks to months. The protocol we use as a “gold standard” for the treatment of canine multicentric lymphoma is a 25-week protocol called *UW-25*. It is based on a commonly used protocol called *CHOP* that is used to treat lymphoma in humans.

The *UW-25* protocol may not be appropriate for all dogs with lymphoma. Different types of lymphoma may be treated with different chemotherapy drugs. For instance, the most effective drug for cutaneous lymphoma is thought to be *lomustine (CCNU)*. The veterinary oncologists and oncology residents at the PUVTH will help you decide on a chemotherapy treatment protocol that is appropriate for your dog.

### **How is chemotherapy given at Purdue?**

Most chemotherapy drugs are given by intravenous (IV) injection, although a few are given by mouth as a tablet or capsule. Typically, an IV catheter will be placed in one of your dog’s veins to allow us to chemotherapy safely. A small patch of hair will be shaved over your dog’s leg where the catheter is placed.

Chemotherapy appointments with the PUVTH oncology service are on weekdays, Monday through Thursday. Patients are usually dropped off at 9 AM and are ready to go home by 12-1 PM.

### **How much does chemotherapy cost?**

The cost for the *UW-25* protocol is currently approximately \$4000-5000, depending mostly upon the size of your dog (the cost is somewhat less for smaller dogs because they receive smaller amounts of chemotherapy). This does not have to be paid all at once, but is paid on a per-visit basis over the course of 25 weeks.

In addition to the *UW-25* protocol, there are several other chemotherapy protocols that are available for treating your dog’s lymphoma. Some of these therapies are less expensive and require less frequent visits to Purdue.

### **Will chemotherapy make my dog sick?**

Most dogs tolerate chemotherapy well, much better than humans typically do. Although some dogs do get sick from chemotherapy, serious side effects are uncommon. In general, less than 5% of dogs treated with chemotherapy for lymphoma experience side effects that need to be managed in a hospital setting. The most common side effects include loss of appetite, decreased activity level, and mild vomiting or diarrhea that lasts a few hours to a couple of days. If serious or unacceptable side effects do occur, it is important that you talk to one of our oncology doctors or staff about this. We can recommend symptomatic treatment to lessen the side effects. In addition we may recommend reducing the dose of chemotherapy the next time it is to be given.

Unlike people, dogs usually do not lose their hair when treated with chemotherapy. The exceptions to this are poodles, Old English sheepdogs, and some terriers that may lose their hair while receiving chemotherapy.

### **What does *remission* mean?**

“Remission” means a regression of your dog’s cancer. Remission may be *partial*, meaning the overall cancer burden has been reduced by at least 50%, or it may be *complete*, meaning the cancer has become undetectable to any readily available screening test. In general, 70-90% of dogs with multicentric lymphoma treated with UW-25 experience complete or partial remission of their lymphoma, with most dogs experiencing complete remission.

### **Will chemotherapy cure my dog’s lymphoma?**

In rare instances, dogs are apparently cured of their lymphoma by chemotherapy. Unfortunately, most dogs with lymphoma will have relapse of their cancer at some point. A second remission can be achieved in a large number of dogs, but it is usually of shorter duration than the first remission. This is because the lymphoma cells become more resistant to the effects of chemotherapy as time goes on. Eventually, most lymphomas develop resistance to all chemotherapy drugs, and dogs with lymphoma die or are euthanized when the cancer cannot be controlled.

### **What is the prognosis for dogs with lymphoma?**

In general, the prognosis is determined by what type of lymphoma your dog has and what type of chemotherapy is used to treat the lymphoma. *The median (“average”) length of survival of dogs with multicentric lymphoma treated with UW-25 chemotherapy is between 9-13 months.* This means that at least half of the dogs treated with UW-25 will live this long. Some dogs live considerably longer than this, while others do not live this long. Various other factors may affect your dog’s overall prognosis. The oncologists and oncology residents at the PUVTH will discuss your dog’s prognosis in detail with you before any treatment decisions are made.

## **Are there any studies at Purdue involving canine lymphoma?**

Yes. We are currently conducting a clinical trial in dogs with multicentric lymphoma. This trial is attempting to answer how one of the drugs in the UW-25 protocol, *prednisone*, is associated with the development of chemotherapy resistance.

Prednisone is one of the most commonly used drugs in chemotherapy protocols for lymphoma, and has been used to treat lymphoma for decades. Recently, however, questions have been raised as to whether prednisone could have any detrimental effects in the treatment of lymphoma. Previous studies have demonstrated that treatment with prednisone *before* starting a combination chemotherapy protocol is associated with a shorter duration of remission, decreased survival time, and increased risk of the cancer being resistant to chemotherapy. It is thought that this less favorable outcome is due to prednisone causing chemotherapeutic drug resistance. It is not currently known if prednisone therapy has any adverse effects when started at the time that chemotherapy is initiated. It is also not known whether the incorporation of prednisone into a multi-drug protocol for lymphoma is more often beneficial or detrimental.

The purpose of this clinical trial is to assess the importance of prednisone in a combination chemotherapy protocol (UW-25) for canine lymphoma. Dogs entering into this trial will be randomly assigned to receive either the standard UW-25 protocol (the current standard of care for canine lymphoma that does include prednisone) or a modified UW-25 protocol that does not include prednisone. Dogs will be eligible for the clinical trial if they have a biopsy diagnosis of multicentric lymphoma and have received no prior chemotherapy or radiation therapy treatment within the past 30 days. They must also not have received previous treatment with prednisone or other steroid drugs such as *dexamethasone* or *Depo-medrol* within the past 30 days.

Financial benefit will be provided for owners of dogs enrolling in the clinical trial. The treatment for dogs in the trial will cost approximately 10% less than it would otherwise. For instance, if treating your dog would normally cost \$5000, a discount of approximately \$500 will be applied to your dog's treatment.

For more information about this clinical trial please contact Dr. Michael Childress at (765) 494-1107 or [mochilchr@purdue.edu](mailto:mochilchr@purdue.edu), or you may contact Sarah Lahrman at (765) 496-6289 or [salahrma@purdue.edu](mailto:salahrma@purdue.edu).