



# CANINE B-CELL LYMPHOMA



## What is B-cell lymphoma in dogs?

B-cell lymphoma is a cancer of a type of white blood cell called a lymphocyte. Lymphocytes are found throughout the body – both in the blood stream and in various tissues and they act to fight infection. There are two types of lymphocyte: B lymphocytes (B cells) and T lymphocytes (T cells). Lymphoma can develop from either B cells or T cells and occurs when lymphocytes grow and divide in an uncontrolled fashion. They invade normal tissues and prevent them from functioning normally. The most common type of lymphoma affects the lymph nodes, but other tissues such as the liver, spleen, intestines, kidneys and bone marrow can also be involved.

There are different types of B-cell lymphoma, although some are very rare and different types of B-cell lymphoma are often grouped together depending on how they develop or how they behave. The most common type of B-cell lymphoma in dogs is called diffuse large B-cell lymphoma (DLBCL). Lymphoma can be high or low grade, which tells us how aggressively it will behave.

## Symptoms

Most dogs with B-cell lymphoma usually have painless lumps, often in the neck, armpit, groin and back legs. These are swollen (enlarged) lymph nodes. They usually grow quite quickly, over just a few weeks. Lymphoma can also develop outside lymph nodes, so called 'extra-nodal' disease.

The exact symptoms depend on where in the body the lymphoma is. These are called local symptoms. They can be very variable depending on what organs or tissues are affected. For example: lymphoma in the stomach or bowel can cause abdominal discomfort, diarrhoea or vomiting. Lymphoma in the chest can cause a cough or breathlessness. Other symptoms can include general lethargy, loss of appetite, weight loss, fever and excessive drinking and urination.

## Diagnosis

The main way to diagnose B-cell lymphoma in dogs is to take a sample from one or more of the swollen lymph nodes. This can be done either by fine needle samples or biopsy. Fine needle aspirate is a simple procedure using a small needle to collect cells from the enlarged lymph node. This procedure is quick and can be carried out without any sedation in most cases. From the fine needle aspirates taken, we can also perform a test flow-cytometry (takes ~2-3 days to have results back) or immunocytochemistry (takes up to 2 weeks) to differentiate between a B cell or T cell lymphoma.

In some instances, we need to take a biopsy under general anaesthesia, involving the removal of a larger sample of tissue; this is usually carried out if the results of the fine needle aspirates are not conclusive.

To allow evaluation of internal lymph nodes and organs, patients usually have chest x-rays and an ultrasound scan together with needle biopsies. Mild sedation is usually required for these procedures. This process is known as staging and it is important because the stage of the disease affects the prognosis. For this reason, in some occasions, we also recommend samples of the bone marrow to investigate whether or not cancer cells are present. This procedure is carried out under a short general anaesthetic. Blood sampling is also performed to assess a patient's general health status and to check for any sign of lymphoma in the blood stream.

Providing the patient is well and clinically stable all of these tests are done on an outpatient basis and the results are usually available within a few days for the fine needle aspirates and 10-14 days for any tissue biopsy results. You may decide not to opt for staging after discussion with the oncology team.

## Treatment

The aim of chemotherapy is quality of life over quantity. Chemotherapy is the treatment of choice for lymphoma, because the cancerous cells are usually spread throughout the body. The goal is to induce a "remission" by killing the cancer cells. "Remission" means that there is no visible evidence of the lymphoma. However, it is likely that some cancer cells will survive and eventually these cells grow and cause the lymphoma to return ("relapse").

Dogs with B-cell lymphoma receive a short course of chemotherapy. The most commonly used protocol is called CHOP: cyclophosphamide, hydroxydaunorubicin (doxorubicin), vincristine and prednisolone. This is the same protocol that is used in people with lymphoma, and there are alternative options if this doesn't suit your dog. Most of these drugs are given as injections into the vein whereas prednisolone is given as tablets at home. A blood test will be performed at each visit to check the blood cell count to ensure it is safe to administer chemotherapy. Dogs usually have the treatment as an outpatient and go home the same day – the majority do not require sedation. Each appointment usually takes around a few hours. The drugs are given in cycles, with treatment given once every week for four times followed by a two-week break. The cycle is then repeated another three times for a total of four cycles (19 weeks overall).

Chemotherapy agents can be excreted in the urine and faeces, and care must be taken when handling your dog's waste. You will be advised of appropriate precautions, and it is important to note explicitly that pregnant women should avoid contact with the dog's waste following chemotherapy.

## Outcome

In dogs it is very uncommon to cure lymphoma. The aim of the treatment is to make your dog feel better for as long as possible with minimum side effects. Survival times for dogs with B-cell lymphoma are variable and depend on the tumour type and extent of the disease

(stage). For the most common type of lymphoma (DLBCL) the average survival time with treatment is around 12 months, with 20% of dogs alive two years after diagnosis.

With only steroids and symptomatic treatment (palliative care) the average survival time is around 2-3 months but this can vary. Without any type of treatment, the survival time is usually only a few weeks.

## Complications

Most dogs undergoing treatment for B-cell lymphoma experience a normal quality of life. Side effects are uncommon and in very rare occasions may require hospitalisation. Most side effects are managed at home only with symptomatic treatment and usually resolve within a few days. The main side effects from chemotherapy are:

Gastro-intestinal: mild vomiting, diarrhoea and inappetence can be seen. We use anti-nausea medication to prevent this as much as possible  
Bone marrow suppression: chemotherapy can reduce the white cell count, and we perform regular blood tests to monitor for this. A low white cell count can increase the body's susceptibility to infection which in very rare occasions might be life threatening (sepsis)

Cyclophosphamide can rarely cause inflammation of the bladder (cystitis). We minimize the risk by checking the urine before each treatment. We also prescribe water tablets with cyclophosphamide to try and "wash out" the remainder of the drug to reduce the risk of any damage to the bladder.

Doxorubicin can cause heart damage (cardiotoxicity) but this is a cumulative effect after multiple doses. To reduce the risk of this happening we may perform a heart scan in patients with known heart disease or breeds at high risk of heart problems.

Please monitor your pet closely after each treatment and telephone us if you feel your pet seems ill or you have any questions or concerns (01268 564664).



## What happens when treatment is complete or the lymphoma comes back?

Once the treatment is completed the clinician will discuss follow-up appointments for monitoring. These can be done either with us or your local practice if more convenient. We usually advise monitoring every month for the first two months and then reduce the frequency to every three months until relapse occurs (the lymphoma comes back). Monitoring usually involves a physical examination performed by a veterinary surgeon, although blood tests and scans may be recommended.

When the lymphoma relapses we usually advise rescue chemotherapy. This could be another CHOP protocol unless relapse occurred during treatment or within one month after completing treatment. If this occurs, we would elect to switch to a different chemotherapy protocol. At the moment there are multiple rescue protocols for canine lymphoma with variable success rate in the rescue setting.

If you have any further questions please do not hesitate to contact the hospital.



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