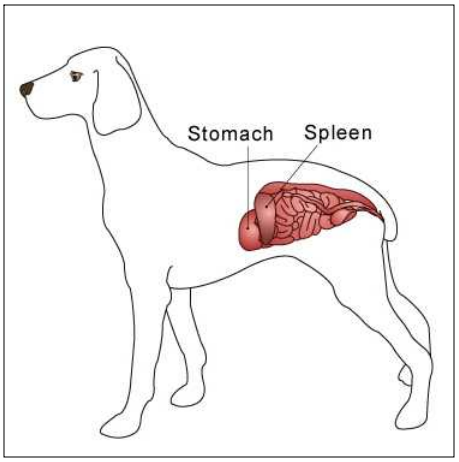
TUMORS OF THE SPLEEN

These notes are provided to help you understand the diagnosis or possible diagnosis of cancer in your pet. For general information on cancer in pets ask for our handout “What is Cancer”. Your veterinarian may suggest certain tests to help confirm or eliminate diagnosis, and to help assess treatment options and likely outcomes. Because individual situations and responses vary, and because cancers often behave unpredictably, science can only give us a guide. However, information and understanding for tumors in animals is improving all the time.

We understand that this can be a very worrying time. We apologize for the need to use some technical language. If you have any questions please do not hesitate to ask us.

What is the spleen?

The spleen is an organ near the stomach in the abdomen. Its main function is to filter the blood (red pulp), removing worn out blood cells and recycling the proteins and iron. It is also a reserve factory for manufacture of blood cells. In horses and some dogs such as greyhounds, the organ is a reserve for the oxygen-carrying red cells required for sudden bursts of activity.



The spleen also contains large numbers of cells of the immune system (lymphocytes and macrophages). These cells are involved in recognizing ‘foreign’ potentially harmful materials like infectious microorganisms and helping the destruction of them and then protection (immunity) against future attack.

What type of tumors form in the spleen?

Tumors of the spleen are common in older dogs, but rare in cats. Most enlargement of the spleen is not cancerous and due to blood accumulating as a result of poor circulation, often with bleeding within the spleen (**hematomas**). Sometimes excessive work in making blood components (hemopoiesis) or excessive breakdown of blood cells cause enlargement. Tissue overgrowths (hyperplasias), either of lymphoid cells or macrophages with fibrous tissue (**fibrohistiocytic nodules**) are also common. Less commonly, enlargement is due to infection or inflammation of the spleen (**splenitis**).

Cancers of the blood vessels are also common in the spleen. Some (**hemangioma**) are benign (non-spreading) and others (**hemangiosarcoma**) are malignant (spreading). Cancer of the lymphocytes (**lymphoma**, **lymphosarcoma**), other white blood cells (**leukemia**) and mast cells (**mastocytoma**) may involve the spleen.

What do we know about the causes?

The reason why a particular pet may develop this, or any cancer, is not straightforward. Cancer is often seemingly the culmination of a series of circumstances that come together for the unfortunate individual.

Non-cancerous enlargements are due to increased work by the spleen, or passive enlargement with blood. Cancer is non-lethal genetic damage of cells (mutations in the DNA genome). Some hyperplasias may therefore progress to cancers because the more divisions

a cell undergoes, the more probable is a mutation. Some never progress past the first stages so remain benign. Genetic and environmental factors are also important.

Feline leukemia virus (FeLV) causes cancers of the blood and lymphoid system in cats. Different strains of the virus cause cancers at different times. If a cat is also infected with feline immunodeficiency virus (FIV), the risk of developing cancer increases. Some types of lymphoid cancer in dogs are also associated with virus infection.

Why has my animal developed this cancer?

Your pet may have a genetic tendency to cancer and have had an infection or contact with chemicals in the environment, which have initiated or promoted the cancer. Your cat may currently be infected with FeLV or FIV or have been exposed to viral infection.

Are these common tumors?

Tumors are common in the spleens of older dogs but rare in cats. Most old dogs have knobbly spleens. These are usually due to blood accumulating or bleeding in the spleen, or hyperplasias known as 'fibrohistiocytic nodules'. These rarely become cancerous. Hemangiomas and hemangiosarcomas are common in dogs. German Shepherds have a high incidence of hemangiosarcoma.

Lymphoid cancer is common and the spleen may be involved along with other parts of the body. In dogs, the prevalence rate is 13-24 cases of all types of lymphosarcoma per 100,000 dogs at risk. Pups as young as four months may have these cancers but 80% of cases occur between the ages of 5 and 11 years. Boxers have a higher incidence than other breeds. In cats, lymphoid cancer is the most common cancer making up approximately one in three cancer cases. In surveys, the incidence rate is 50-200 per 100,000 cats. Tumors are most common in mature cats aged 6-12 years.

Malignant histiocytosis affecting the spleen and other organs is common in the Bernese Mountain Dog. Other cancers of the spleen are uncommon to rare.

How will these cancers affect my pet?

In dogs, swelling of the abdomen due to increased size of the spleen is common. If there is pressure on the stomach, there may be vomiting and loss of appetite. Other signs include lassitude, fever, weight loss, small bleeding points, anemia, diarrhea and increased urination. Rapid growth and bleeding may make the spleen rupture with life-threatening acute collapse and breathing difficulty.

With lymphoid tumors in dogs, there is usually bilateral and symmetrical swelling of the lymph nodes as well as the cancer in the spleen. Some dogs have abnormal lymphocytes in the blood (leukemia).

Most cats with splenic tumors will show symptoms of a swollen abdomen, weight loss, diarrhea or constipation and vomiting. Kidney failure and anemia are also common.

About 10% of these lymphoid tumors induce other, clinical signs that are not readily explained by spread of the tumors. These are known as paraneoplastic syndromes. Some are due to abnormal hormone production by the cancer. Examples include increased blood calcium levels and increased blood gamma globulin (immune system related protein). Both these adversely affect kidney function with increased thirst and urination.

How are these cancers diagnosed?

Cancer is often suspected from clinical signs, particularly physical examination by your veterinarian. X-rays and ultrasound are often helpful to detect tumors. Blood samples may

X-ray and Ultrasound machines

indicate anemia but this is not specific and only a few tumors will have cancer cells in the blood.

In order to identify the tumour definitively, it is necessary to obtain a sample of the tumour itself. This usually involves exploratory surgery to obtain tissue samples for microscopic examination. Cytology, the microscopic examination of cell samples, is not reliable for tumors of the spleen. Histopathology, the microscopic examination of specially prepared and stained tissue sections, is needed. This is done at a specialized laboratory where the slides are examined by a veterinary pathologist.

The histopathology report typically includes additional information that helps to indicate how the cancer is likely to behave. Diagnosis of lymph cancers can be difficult and some types of hyperplasia progress to neoplasia (cancer).

What types of treatment are available?

Surgical removal of the whole spleen is the treatment of choice for these tumors. Benign tumors will only affect the spleen but most malignant cancers have already spread before diagnosis and surgery. Removal of the spleen does not cure the disease although it slows the progress.

In some countries, chemotherapy is used to induce remission and prolong life in lymphoid, blood and mast cell cancers. It rarely cures the disease. Significant remission is more likely for smaller and more rapidly dividing tumors. The drugs used are toxic to organs with dividing cells such as the intestine, bone marrow and skin. Some also affect other organs such as the liver to induce malaise. The best system of chemotherapy is still uncertain.

Steroid drugs such as prednisolone will give short term palliation up to a few months. However, their use will promote resistance to other chemotherapy drugs and may shorten remission of subsequent multi-drug chemotherapy.

Can these cancers disappear without treatment?

Cancer rarely disappears without treatment but as development is a multi-step process, it may stop at some stages. The body's own immune system can kill cancer cells but it is rarely 100% effective. These cancers have ready access to the lymph and blood transport systems so they are often widespread before diagnosis. Poor blood supply and degeneration of tumors is relatively common but does not eliminate them. Significant death of tissue causes toxic and mechanical problems so the spleen still needs removal.

How can I nurse my pet?

After surgery, your pet must not interfere with the operation site. This needs to be kept clean. Any loss of stitches or significant swelling or bleeding should be reported to your veterinarian. You may be asked to check that your pet can pass urine and feces or to give treatment to aid this. If you require additional advice on post-surgical care, please ask.

If your pet is to have chemotherapy, you need to understand the risks involved in use of these unlicensed and toxic drugs. The safety precautions required to protect yourself, other people and the environment when handling and disposing of these drugs will be explained if you consent to their use.

How will I know how the cancer will behave?
Histopathology will give your veterinarian the diagnosis that helps to indicate how it is likely to behave. The veterinary pathologist usually adds a prognosis that describes the probability of local recurrence or metastasis (distant spread).

When will I know if the cancer is permanently cured?
'Cured' has to be a guarded term in dealing with any cancer.

Siderotic nodules or 'Gamna-Gandy bodies' are common in elderly dogs and are not clinically significant. They indicate previous bleeding. Myelolipoma is also a benign, incidental finding.

'Fibrohistiocytic nodules' are proliferations of lymphoid tissue (white pulp), fibrous cells and histiocytes. In one study most dogs with grade I and II (benign) nodules were alive 12 months after removal of the spleen but only half the dogs with grade III nodules (malignant cancers) were alive. The grade III nodules also grade into malignant histiocytosis which involves many organs and has a short survival time, often only weeks.
Hemangiomas are benign tumors so there should be complete cure after removal of the spleen. However, some are difficult to distinguish from malignant hemangiosarcoma and a few may also be in other organs and progress to malignancy.

Hemangiosarcomas are usually highly malignant and have already spread elsewhere (metastasized) before surgery. Stage I hemangiosarcoma is confined to the spleen but stage III has spread to other sites in the body. This may be to any tissue but commonly the lungs, liver, heart, skin and bones. After removal of the spleen, the average survival time is about three months. Up to nine months is possible. Clinical signs associated with recurrence of the tumour include sudden death, acute collapse and shock, rapid breathing, anemia and skin nodules or masses.

Plasmacytoma may be inactive for long periods but progress to malignancy within a year of biopsy. Some plasma cell proliferations are part of the malignant disease, multiple myeloma.

Mast cells tumors of the spleen are part of widespread mast cell deposits with leukemia. They are rare but most common in cats. Ulcers of the stomach and intestine and an enlarged liver mean that the clinical illness often persists after removal of the spleen. Chemotherapy may be palliative.

Cancerous proliferations of other white blood cells in the spleen are rare. Removal of the spleen and chemotherapy may be palliative. Anemia and clotting problems may be present. Acute myeloblastic leukemia has a 2-3 week course from the time of diagnosis. Death is usually due to bleeding and infection.

Without treatment, dogs with lymphoid tumors have a life expectancy averaging ten weeks but a few live six to twelve months. Survival with the intestinal form averages only eight weeks. Older dogs tend to survive longer than younger dogs. Chemotherapy remissions of up to a year are not uncommon in dogs but depend on the type and stage of the cancer at diagnosis. Without treatment 40% of cats are dead within four weeks and 75% eight weeks following diagnosis. The average survival time with chemotherapy is 3.5 months for virus positive cats and 5 months for non-viral infected cats.

Are there any risks to my family or other pets?

Feline leukemia virus can cause cancers of both the blood and lymphoid system in cats. The virus is occasionally transmitted from an infected queen to her kittens before birth but is more commonly acquired from close contact with infected cats, which shed the virus in saliva, urine and feces. If your cat is infected, he or she can pass the infection to other cats. The infection is not transmissible to people. Similarly feline immunodeficiency virus, which is similar to HIV in people, only affects cats and cannot infect people or other animals such as dogs.

The other tumors are not infectious and are not transmitted from pet to pet or from pets to people.

This client information sheet is based on material written by Joan Rest, BVSc, PhD, MRCPath, MRCVS.