



Malignant Mammary Tumors in Dogs

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 this tumor?

This is a tumor originating from the mammary gland tissues that has been classified as malignant (invasive and capable of spreading). Although some of these cancers are cured by surgical removal, others recur and some spread to other parts of the body (metastasis). A dog that has a tumor of this type often has or will develop further tumors in other mammary glands.



Malignant cancerous growths may arise from the epithelium that normally produces milk (**simple mammary carcinoma** or **adenocarcinoma** and **secretory carcinoma**). Others arise from the ducts (**ductal** or **ductular carcinoma**). Some include other tissues such as the myoepithelium and connective tissue between the glands. These have a number of different names including **carcinosarcoma**, **carcinoma** or **sarcoma** in benign tumor, **complex adenocarcinoma** and **malignant mixed tumor**. Tumors are also classified by the type of epithelial growth because this influences the probability of recurrence. Tumors that only have myoepithelium or connective tissue are called **sarcomas**.

Any mammary lesion may be inflamed (mastitis) and a few lumps are solely due to inflammation.

What do we know about the cause?

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.

Cancer is the result of non-lethal genetic damage to cells (mutations in the DNA genome). Some animals have a genetic tendency to develop cancer and the risk increases with increasing age. However, sex hormones are the most important single factor promoting

development of mammary tumors in dogs. If the ovaries and uterus are removed by ovariectomy (spay) at an early age, there is less risk of these tumors developing.

Cancer induction is a multi-step process and some tumors remain benign (non-spreading). Others progress rapidly to malignancy and some are malignant from the start.

In some species of animals, viruses are important factors in inducing mammary cancer but, as far as we are aware, this is not true in dogs.

Why has my pet developed this cancer?

It is often chance misfortune that leads to the development of cancer. Some animals have a greater tendency (inherited genetic susceptibility) to cancer. Some breeds have far more cancers than others, and certain breeds tend to get certain types of cancer.

The more divisions a cell undergoes, the more probable is a mutation to occur, so cancer is more common in older animals.

Mammary tumors need hormones to start growing. However once they are malignant, these tumors are no longer influenced by hormones.

Are these common tumors?

Mammary tumors are common in female dogs, mainly in middle aged to older animals. They are rare in male dogs. Malignant (spreading, life-threatening) tumors of mammary glands are less common than benign ones. Fortunately, the most malignant types (ductal/ductular carcinomas and sarcomas) are the least common of all.

How will the cancer affect my pet?

The most obvious effect is a lump or multiple lumps in the glands. Some tumors produce secretion (clear, cream or blood-stained fluid which may be expressed from the teat). Ulceration is not uncommon and these tumors are often firmly attached to the surrounding structures with poorly demarcated edges. Inflammation and secondary infection are possible with pain and general signs of illness. Large tumors may lose some of their blood supply and there may be physical effects on the surrounding structures.

Weight loss due to loss of body fat and muscle may occur in the later stages of malignant cancer. The immune system is often damaged which allows cancers to develop and infections to persist. A few tumors induce disease signs that are not readily explained by local or wider spread of the cancer but, in contrast to similar tumors in women, this is rare with canine mammary tumors. If the cancer metastasizes to the lungs, there may be shortness of breath and difficulty breathing. A few cancers spread through the skin, producing inflammation.

How are these cancers diagnosed?

Clinically, these tumors are often suspected by the typical appearance. Accurate diagnosis of the type (and therefore how it will behave) relies upon microscopic examination of tissue.

Cytology, the microscopic examination of cell samples, is not an accurate method of diagnosis for this group of tumors. Accurate diagnosis, prediction of behavior (prognosis) and a microscopic assessment of whether the tumor has been fully removed rely on microscopic examination of actual pieces of tumor tissue (histopathology). This is done at a specialized laboratory by a veterinary pathologist. The piece of tissue examined always needs to include the edges of the lump.



Examination of the whole lump will indicate whether the cancer has been fully removed.

The histopathology report typically includes words that indicate whether a tumor is 'benign' (non-spreading, local growth) or 'malignant' (capable of spreading to other body sites). These, together with the origin or type of tumor, the grade (degree of resemblance to normal cells or 'differentiation') and stage (how large it is and extent of spread) indicate how the cancer is likely to behave.

What types of treatment are available?

The most common treatment is surgical removal of the lump. Sometimes this is just the lump and sometimes the whole gland and draining lymph node are removed. Many glands and lymph nodes may be removed if there are several tumors.

Spaying (ovariohysterectomy) early in life reduces the incidence of mammary cancer. However spaying at the time of tumor removal does not affect growths that are already malignant because these are already beyond hormone control. The exception is the secretory carcinoma. This is usually a tumor of young female dogs and is dependent on the female hormone estrogen. Ovariohysterectomy therefore removes the stimulus to further growth.

Decisions on additional treatment include consideration of the quality of life such treatment will give an animal. Additional therapy is not suitable for all types of cancer and often has significant side effects. Some types are only available at specialist centers. Current recommendations are therefore surgery as the primary treatment and, possibly, additional therapy for aggressive tumors with lymphatic invasion and poor surgical margins (but not secondary tumors). Some medical hormonal treatments used in women induce cancers in dogs rather than curing them. Chemotherapy has not been proven to be successful in dogs with mammary cancer. New research is focussing on using certain enzymes to destroy tissue, gene therapy and inhibitors of new tumor blood vessel formation (angiogenesis). Immunotherapy is not helpful because mammary tumors are poor producers of antigens.

Can these cancers disappear without treatment?

Generally, no. Spaying does not affect these cancers or prevent recurrence.

Very occasionally, spontaneous loss of blood supply to the cancer can make it die but the dead tissue will still need surgical removal. The body's immune system is not effective in causing this type of tumor to regress.

How can I nurse my pet?

Preventing your pet from rubbing, scratching, licking or biting the tumor will reduce itching, inflammation, ulceration, infection and bleeding. Any ulcerated area needs to be kept clean.



After surgery, the operation site similarly needs to be kept clean and your pet should not be allowed to interfere with the site. Any loss of sutures or significant swelling or bleeding should be reported to your veterinarian.

If you require additional advice on post-surgical care, please ask.

How will I know how this cancer will behave?

Histopathology will give your veterinarian the diagnosis that will indicate the tumor type and how it is likely to behave. However, there is significant variation between individual animals in their response to mammary tumors and the probability of further cancer development. The behavior of some tumor types is difficult to predict and other tumors can be multiple. Returning for post-surgical checks is therefore important.

Smaller tumors usually have a better outlook (prognosis). The staging (lymph node or distant metastasis) also affects the prognosis. The type of cancer is also important. Malignant tumors with a connective or myoepithelial component (mixed tumors, carcino-sarcomas and sarcomas) tend to be more malignant than epithelial tumors but epithelial tumors arising from the ducts (ductal or ductular carcinoma) are also highly malignant. In one study less than one in five tumors were of this type but they caused two thirds of fatalities. Overall, 35% of malignant tumors metastasize and 70% are cured surgically. Most secondary tumors are in the lungs and, in contrast to women, rarely in bones.

When will I know if the cancer is permanently cured?

'Cured' has to be a guarded term in dealing with any cancer.

It is very difficult to promise complete cure once your dog has developed mammary tumors but the following general guidelines may help. Mammary tumors are age dependent so an older bitch will have a higher probability of recurrence and the proportion of malignant tumors increases with age. There is also a familial incidence for tumors. German Shepherd dogs tend to have a worse prognosis than other breeds.

Multiple tumors are also common. In one study, 60% of female dogs had more than one mammary tumor and in a shorter study, approximately 25% of dogs developed more tumors following removal of one. Growth in the different glands is usually multifocal not seeding.

Are there any risks to my family or other pets?

No, these are not infectious tumors and are not transmitted from pet to pet or from pets to people.