

# A PRACTICAL GUIDE TO CANINE CANCER FOR THE DUTIFUL DOG OWNER

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## *INTRODUCTION - PART I*

One would hope to be spared the difficulty of dealing with a beloved pet ill with cancer, but the longer life expectancy of our pets has made this situation increasingly commonplace. However, two things need to be remembered; first, treatments are readily available through local veterinarians in protocols developed specifically for dogs. Secondly, an animal is spared the mental anguish of knowing that it may be terminally ill. This is very important to remember, because many dogs feel no illness in the early stages of disease; a diagnosis of cancer need not require an immediate decision for humane euthanasia, although this may be the best decision days, weeks, months, or even years later.

Hopefully, these articles will serve as a reference for dog owners by presenting the philosophy of veterinary cancer treatment, by describing some of the major cancers in the dog, and by outlining methods of therapy that would be available through local veterinarians who are interested in treating cancer patients. Not every diagnosis of cancer requires a pilgrimage to a college of veterinary medicine or a medical research institute!

Treating cancer in animals differs from treating cancer in humans in one very fundamental way: we try not to make an animal feel sick! But this also means that we rarely try to achieve a complete cure. The goal is to extend the length of a quality life, not life at any cost. Drug doses are kept lower than they are in man so that our canine patients rarely experience vomiting, diarrhea, or loss of appetite. Remember! Many of these dogs don't even know that they are sick! No veterinarian would choose to give a happy dog six months of nausea; the choice more likely might be three months of happiness at home on a mild cancer-fighting drug or even one month on no drugs at all. This is not to say that drug reactions may not occur; these are certainly potent drugs and they will be described in detail in Part II of this article.

Finally, it should be understood that all cancer therapy can be seen as either surgery, drug therapy, or a combination of both. Most animal cancers are treated with surgery by both local veterinarians as well as by research veterinarians specializing in oncology. As the listing below will demonstrate, many cancers in the dog are not killed by any drugs, and surgery remains the only effective treatment. On the other hand, cancers like lymphosarcoma and transmissible venereal tumor are generally best treated with drugs alone.

## ***THE MAJOR CANCERS OF DOGS AND THEIR TREATMENTS***

### **LYMPHOSARCOMA AND LEUKEMIAS:**

Leukemias are cancerous cells of lymph node or bone marrow origin that circulate freely in the blood. Division may occur in the bloodstream, the bone marrow, the lymph nodes, or even in the spleen. Many different kinds of leukemic diseases exist, all based on which type of cell is multiplying malignantly. It is fortunate that these diseases are rare in the dog, since they can be difficult to treat. The same drugs that are successful against lymphosarcoma are the only available weapons against leukemia, but, in the latter, they are less effective.

Lymphosarcoma, cancerous enlargements of the lymph nodes, is considered one of the most common cancers in the dog. Unlike the cat, this disease is not contagious between dogs through an infectious virus. Also, unlike the cat, the many forms of the disease are less common. Generally, the owner notices swellings developing in the belly, under the chin, in front of the shoulders, and/or behind the knees. The dog may be lethargic or not eating well, but more often the dog is eating and playing normally.

A veterinarian would diagnose the condition by taking cells out of any of the suspicious lymph nodes with a sterile syringe and needle. These can then be examined under an office microscope for cancerous changes. This is called 'a needle aspirate' and is no more painful than a routine vaccination. The size of the needle is the same, and no sedation or anesthesia would be needed for the average dog. Less common forms of the disease would be harder to diagnose with a simple test like the needle aspirate, because these include invasion of the skin, intestines, kidneys, or nervous system by cancerous lymphocytes. Regardless of the form of lymphosarcoma, drug treatment is the cornerstone of therapy as the cancerous cells are generally dispersed throughout the body. In some instances, lymphocytic tumors will localize in only one place and then can be removed surgically. The most common locations are solid masses in the intestines or solid masses in the spinal cord. Nevertheless, surgery will be followed with chemotherapeutic drugs.

Life expectancy for lymphosarcoma of the lymph nodes depends greatly on what drug combination is elected for the patient. Generally, dogs without any treatment at all are unlikely to live comfortably for more than three months while drug therapy may produce a disease-free state for two years or more. Many effective drugs are available through local veterinarians; others can only be safely administered at a college of veterinary medicine or a research institute like the Animal Medical Center in New York or the Angell Memorial Hospital in Boston.

### **TUMORS OF THE MOUTH**

While several completely different types of cancers can develop in the mouth, they all share two important traits: first, they are generally malignant. Secondly, they require early recognition and radical surgical techniques for there to be any hope for long-term remission. Drug treatment alone is not effective. These tumors may develop from the bones of the face and jaw (osteosarcomas and fibrosarcomas) or they may develop from the surrounding gums, skin or tongue (squamous cell carcinomas or malignant melanomas). Often the first signs of a growth are simply difficulty in eating, chewing or swallowing such as food falling from the mouth, gagging, drooling, or a foul breath.

Squamous cell carcinoma is seen in older dogs and, fortunately, generally develops from the gums of the jaw where it is seen at an early stage by the owner and where it is accessible to surgery. Rarely, the tumor may grow on or underneath the tongue, where it may be difficult to remove. A dog needs at least one-third (and ideally two-thirds) of its tongue to eat and to drink properly. Special surgical techniques may be effective in shrinking the tumor or, in some cases, actually killing it without damaging normal tissue. These techniques would include cryosurgery (killing cancer cells by freezing with liquid nitrogen) which would be available at some local veterinary hospitals or radiation therapy which would only be available at colleges of veterinary medicine or research institutions. These institutions have also developed pellet implants of potent cancer-fighting drugs or radiation that could be effective in some cases of inoperable tumors. Even with these advanced techniques, squamous cell carcinoma of the tongue can be difficult to treat.

Squamous cell carcinoma of the gums may require radical surgery as well. Even if the tumor appears small, a veterinarian will advise a chest radiograph to check for spread of the cancer. These tumors are malignant! If metastasis is not seen, a radiograph may also be taken of the growth itself to look for evidence that the tumor has invaded bone. If it has, you will be told about an extremely radical surgery indeed. It would involve removal of the bone in a section surrounding the tumor. This is also the recommendation for malignant melanomas which, like squamous cell carcinomas, grow from the gum and into the bone as well as for the osteosarcomas and fibrosarcomas which originate from within the bone itself.

This surgery can really be considered an amputation of the upper or lower jaw. Although it may surprise you to read this, dogs do very well with only one-half of their jaw! Obviously, this is a very radical procedure and would only be for selected cases. For instance, a rugged, out-going eight year old Beagle would probably do very well with this surgery, eating canned food the next day and living six to eighteen months, even if tiny, radiographically-invisible metastases had already occurred. But a veterinarian might not recommend this procedure for a timid 13 year old Yorkshire terrier. Remember! The veterinarian's credo is 'doce nocere' ("Do no harm").

Unfortunately, there are no drugs falling in the safer categories that significantly help shrink or slow the growth of these tumors, although Lomustine (CEENU) and the anti-arthritis drug Piroxicam have been shown to slow the growth rate and relieve pain. Additionally a new anti-melanoma vaccine has been developed and does help control oral melanomas. However, in most cases, without surgery of some kind, most of these dogs must be euthanized because they become unable to eat or suffer repeating episodes of bleeding from the tumor. Again, some help may be found at research institutions, but the prognosis is still grave, even with specialized technology such as radiation or implants of pelleted drugs. The foundation of treatment for these tumors of the mouth remains surgical removal of the tumor as early as possible, and including parts of the upper or lower jaw if necessary.

## **MAMMARY CANCER**

Surgery is the mainstay of both prevention and therapy in this, the most common cancer of female dogs. **THIS CANCER IS COMPLETELY PREVENTABLE BY OVARIOHYSTERECTOMY AT AN EARLY AGE!** Bitches spayed before their first heat will not develop breast cancer, and bitches spayed by 30 months of age will have a very low risk. After that age, risk continues to rise, although at a less predictable rate.

Once you decide that your bitch will no longer be used for breeding, have her spayed (ovariohysterectomy). Not only will this prevent the high risk of life-threatening uterine infection (pyometra), it may also reduce her risk of breast cancer.

What about the bitch who has already developed a tumor? Should she undergo an ovariohysterectomy at the same time? Research shows that spaying at this point will not decrease the risk of new tumors developing or cancer spreading. However, many veterinarians will encourage an owner to spay the bitch at the same time if the tumor is small. This is done because the risk of most surgery is anesthesia and the incidence of pyometra in an older bitch is quite high. Anesthesia in a bitch toxic from pyometra is extremely dangerous so, if the bitch is going to undergo anesthesia for a short procedure, such as the removal of a small tumor, many veterinarians will recommend spaying at the same time.

Is radical surgery best? As in human medicine, research and debate have been very active, and conclusions show that complete radical mastectomies (removal of the entire chain of mammary glands and attached lymph nodes) is not always needed. It is now known that the first two glands drain to the forward lymph nodes, the last two glands to the rear lymph nodes, and the third gland may drain in either direction, although usually towards the front lymph nodes. It is also generally accepted that any nodule, no matter how small or how slow it seems to be growing, has roughly a 50% likelihood of being malignant. Thus, the general approach to managing a small nodule in a single breast would be to have it removed and sent for a biopsy. If the pathologist feels that malignancy is evident, more radical procedures, such as the removal of a series of glands, would be recommended.

However, certain key indications of malignancy on the first examination might indicate the need for the more radical procedures to be taken immediately. These might include a tumor larger than a pea, or one attached to the overlying skin or underlying muscle, or one that is red or bleeding, or one where the draining lymph nodes are enlarged. These are some of the "Seven Danger Signals of Cancer" as detailed in human medicine by the American Cancer Society. If these or other more subtle signs are recognized by a veterinarian, postponing a radical surgery while waiting for a pathologist's report on a biopsy could lose valuable time. Finally, a veterinarian and a client may choose a radical procedure as a first step if the bitch is related to another dog known to have had malignant breast cancer.

What are these radical procedures? Happily, research has shown that "en bloc" mastectomies of only two or three glands have an equal success rate with radical mastectomies where an entire chain of six glands and two lymph nodes are removed. Thus, if a malignant tumor is located in the fourth or fifth gland, then both will be removed. Similarly, tumors in the first or second glands would require the removal of both glands. The draining lymph nodes would also be removed if there was evidence that the cancer had already spread there. Obviously, tumors in the third gland would require complete removal of all glands. In this location, the veterinarian and the owner might choose to simply remove the one gland and wait for the pathologist's report before proceeding to a complete radical mastectomy.

Before surgery, chest radiographs and blood tests would be done to search for metastases or detect hidden problems in the kidney or liver which might complicate anesthesia. Where suspicion of malignancy is already very high, a chest radiograph is vital; if the tumor has already spread, a radical mastectomy would put the dog through useless surgery. If metastasis has already occurred, considerable relief may be possible for many months by simple medications and diet recommendations that help control infection, inflammation, and fluid build-up in the lungs. Many dogs live up to two years before these signs occur.

Finally, research is continuing in the areas of hormone manipulation, as is currently done in women, as well as radiation, immunotherapies, and certain drug protocols that may prove more effective in the future. Since this disease of dogs is virtually as commonplace as it is for women, it is closely studied by human oncologists as well as those in the veterinary field. Veterinary medical colleges and research institutions can provide the most current information on this and other cancers as our knowledge grows.

## **MASTOCYTOMA**

This is a very common cancer, representing up to 21 % of all skin tumors of dogs. It generally appears as a red, hairless swelling of the skin, clearly visible to the owner, and, occasionally, moist, oozing and angry if the dog finds these nodules irritating and licks them. Diagnosis is often possible by a simple needle aspirate taken in the office, because, like lymphosarcoma, they generally have a characteristic appearance recognizable by the clinical veterinarian. Removal of the tumor and a very wide section of skin around it would be recommended. If surgery is not possible for any reason, some shrinkage and control may be possible with injections of a corticosteroid or by radiation at a veterinary college or research institution.

Signs of illness are not unusual for some dogs who have only small tumors, because the normal mast cells function in allergic reactions and produce chemicals active in inflammation. The surplus of these chemicals (specifically histamine and heparin among others) in malignant mastocytoma may cause the area to be 'itchy' to the dog, and may even stimulate the production of excess stomach acid and block normal blood clotting. This can cause vomiting, anemia, and weakness from bleeding stomach and intestinal ulcers.

Famotidine (Pepcid) may be prescribed to decrease stomach acid production, and anti-histamines may be prescribed to neutralize the excess histamine, and the dog will feel much better. But these drugs do not actually attack the cancer itself. If surgery is unsuccessful or if malignant cells have already spread to the spleen, bone marrow, or other internal organs, then drugs similar to the ones used in lymphosarcoma are necessary. Luckily, many cases of mastocytoma remain quiescent for many months, or even years. Close observation by the owner and frequent medical check-ups are still advised.

## **TRANSMISSIBLE VENEREAL TUMOR**

Since this is a venereal disease, neutered animals and breeding animals that are confined are at a very low risk of developing this disease. It is most common in free-roaming dogs averaging 5 years of age; males and females are at equal risk. Early signs are increased vulva or preputial discharge, which may be bloody, until the growing pink to red, cauliflower-like growths become visible. Licking of the genitals can cause the tumor to develop in the mouth or on the face or even in the nasal passages, resulting in sneezing and nose-bleeds. Fortunately, the tumor, even when it has spread, is very susceptible to the drug vincristine. Thus, this is the one cancer where surgery is not necessary.

Vincristine has now become available in a less expensive form, but must be given by a veterinarian by injection directly into the vein. However, it has few side effects for the majority of patients. Cases will vary in terms of the number of injections required for cure; some have needed only two doses of the drug. Furthermore, this is also the only cancer in the dog where complete remission can be expected. In the few individuals who are not cured with vincristine, the "rescue drug" doxorubicin is very likely to be successful.

## **OSTEOSARCOMA**

The last cancer that deserves mentioning is osteosarcoma of any leg. Here, as in the upper or lower jaw, amputation is the mainstay of treatment and a chest radiograph would be done before the amputation performed. Often the dog is limping, but nothing is felt by the veterinarian on an examination. There may not even be changes noticeable on a radiograph. But these tumors grow rapidly. Generally, within one month, swelling can be felt and changes on the radiograph can be seen. Biopsies may or may not be needed; often the radiographs alone are diagnostic.

Like mammary cancer and many of the oral tumors, this is a malignant disease that has often spread by the time surgery has been performed. This may be true even if a radiograph of the chest showed no tumors. After all, tumors in the chest must be roughly 1/2 inch in diameter to be visible. Like jaw amputation, leg amputation is not for every dog. A frail, aged dog would not do well from this or any other surgery.

But most dogs tolerate amputation extremely well. They are so relieved to be free of pain, that their activity is back to normal long before the sutures are removed. Unlike man, dogs and cats do not appear to experience "ghost limb" phenomena or depression after amputation. With osteosarcoma, a dog may live pain-free for three to six months or longer, before evidence of cancer in the lungs becomes evident by coughing or shortness of breath. But without surgery, the pain will become so excruciating within one to two months that activity and appetite will drop until euthanasia will be necessary.

Chemotherapy with potent drugs has lengthened the life expectancy of many individuals after amputation. Similarly, radiation may decrease the pain for those patients who cannot undergo surgery. However, these protocols are still in the research stage and, thus, obtaining them is only possible through colleges of veterinary medicine or research institutions.

If you are facing a difficult question like amputation or referral to an institution for special drug therapies, your veterinarian may be able to recommend another client that has faced the same situation, or introduce you to a happy three legged dog that is boarding over the week-end. Sometimes it helps to hear about these things from someone who's been there.