



## **MAST CELL TUMORS IN DOGS**

Mast cells are normal cells of the immune system, which start in the bone marrow and then mature in the skin, the digestive tract, and other tissues. Mast cell tumors occur when one of these cells begins dividing uncontrollably and form a lump. Mast cell tumors are the most common malignant skin cancer in dogs. They can also form in the internal organs. A genetic predisposition is suspected, but the exact cause of this cancer is unknown. Certain breeds are at a higher risk for developing mast cell tumors.

Both normal and cancerous mast cells contain hundreds of chemical beads that can be released into the surrounding tissues. These beads contain irritating substances such as histamine, heparin, and other reactive chemicals and enzymes. When these chemicals, particularly histamine, are released by mast cell tumors into the normal body tissues, side effects can include digestive tract upset (including bleeding ulcers), skin rashes, shortness of breath, collapse and rarely death.

### **DIAGNOSIS**

Mast cell tumors can appear as soft, movable lumps under the skin or raised pink or red “buttons” on the surface of the skin. Mast cell tumors can increase and decrease in size (even disappear and reappear!) as chemicals are released from the tumor. Most mast cell tumors can be diagnosed by obtaining a sample with a needle and syringe, and examining a few cells under a microscope. Sometimes, part or all of the tumor must be submitted to a laboratory for an accurate diagnosis. During treatment, blood tests help monitor for side effects from therapy. Blood tests cannot diagnose mast cell tumors unless the cancer cells are actually present in the blood stream, a condition that is rare.

Your dog’s treatment plan can only be determined after we discover the extent of the cancer through a combination of tests known as staging. Staging includes examining microscopic samples of the organs where mast cell tumors commonly spread: local lymph nodes, the spleen, bone marrow, and other areas on the skin.

Another factor that determines treatment for dogs with mast cell tumors is the examination of a solid section of the tumor(s) under a microscope for grading. Grading can help us predict how likely a mast cell tumor is to recur or spread.

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Accurate grading requires a surgical biopsy sample, rather than a sample obtained with a needle and syringe.

## **TREATMENT**

**Surgery** is generally the “first line” and most effective form of treatment for solitary mast cell tumors. A wide margin of normal-appearing skin must be removed from around and beneath the tumor to attempt to eliminate all of the cancer cells. The edges of the tissue are examined under a microscope to determine if any cancer cells may still be present in the patient. Problems with healing at the suture line and re-growth of the cancer are likely to occur when cancer cells are left behind. If your dog’s tumor has not been completely removed a second surgery or radiation therapy may be recommended.

**Radiation Therapy** uses a source of energy to kill cancer cells in a specific local area on the patient’s body. Radiation is most effective when only microscopic amounts of a tumor are present. A series of 16-22 treatments is necessary for tumor control. The side effects and expense are usually greater with radiation than with surgery, but radiation can be performed in areas where further surgery is not possible or would be deforming.

Sometimes a mast cell tumor is too large or aggressive to be eliminated by surgery and/or radiation therapy. A short series of 3-5 radiation treatments may be effective in reducing the size and discomfort of a tumor. This process is called palliative radiation therapy and is lower in cost and side effects than when radiation is used with the goal of curing a patient.

**Chemotherapy** is the most effective form of therapy for mast cell tumors that involve more than one organ in the body. You may be familiar with the side effects of chemotherapy in people. Fortunately, dogs tend to experience few if any of the severe side effects seen in people. For instance, dogs do not lose hair from chemotherapy, unless they are terriers, poodles, or English sheepdogs.

Chemotherapy is the use of medications to interrupt the growth of cancer cells. The medications that are effective in stopping the growth of mast cell tumors will also interrupt the normal replacement of cells that line the digestive tract and the white blood cells that form in the bone marrow to help our bodies fight infection. When chemotherapy drugs damage these normal cells, symptoms can range from a mild, temporary decrease in appetite to loose stools, vomiting, and fever. Again, most dogs have no symptoms; others improve with simple drug store remedies including Pepto Bismol and, most importantly, changing to a bland diet. Stronger prescription medications and antibiotics are sometimes needed, but only rarely do patients require a return visit to the hospital because of side effects. Our philosophy is that cancer patients should feel better, not worse, from their therapy!

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Most side effects occur from the medications we use to block the effects of histamine release by the tumor. Prednisone (a member of the cortisone family) can cause an increase in appetite, drinking and urination, and some dogs feel restless and may pant more than usual. As in people, the antihistamine Benadryl can cause drowsiness. However, the benefit of these medications generally outweighs the potential side effects. Many patients can live comfortably for awhile with prednisone, Benadryl and Tagamet (or Pepcid) even when the actual mast cell tumor fails to respond to treatment.

Most chemotherapy medications must be given as intravenous (IV) injections. Other medications are available as tablets and can be given at home. Although many medications have been effective against mast cell tumors, chemotherapy is most effective when combinations of different drugs are used. Different drug combinations, or protocols, are available and range in cost, effectiveness, frequency of visits and side effects. As oncologists, we will help you decide which protocol is the best start for your dog.

**Combination Therapy** - For some dogs, a combination of the above treatments improves our ability to control mast cell tumors.

### **PROGNOSIS**

Mast cell tumors are sometimes very unpredictable in dogs. The effectiveness of treatment depends on how advanced the disease is and whether your dog has other health problems. Some patients are cured with a relatively simple surgery, while others survive only a few months despite aggressive therapy. We are still learning about the factors that result in a wide range of life expectancy. As individuals, each of our patients will have a slightly different response and outcome. Our goal is to maintain the best quality of life possible!

### **FUTURE CONSIDERATIONS**

Once a mast cell tumor is diagnosed, there is a risk for future development of other mast cell tumors. If these other mast cell tumors occur in another location in the skin, they are not considered to be spread of the first tumor, but rather separate primary locations. It is important that you check you dog carefully, on a monthly basis, for new skin masses of any kind. They should be brought to the attention of a veterinarian so that they may be evaluated by physical examination and microscopic analysis.

Additionally, if your pet has been diagnosed with a mast cell tumor that is considered to be at high risk for spread to other organs or local recurrence, re-evaluation via physical examination, blood analysis, or abdominal ultrasound may be recommended at periodic intervals after the first tumor has been treated.

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