NC STATE Veterinary Hospital

MEDICAL ONCOLOGY

Mast Cell Tumors in Dogs

WHAT IS A MAST CELL TUMOR?

Mast cell tumors are comprised of mast cells, which are immune cells normally involved in allergic reactions. They are the same cells that cause the itchy, red bump you get after a mosquito bite, or the more serious reactions that occur in people allergic to peanuts or shellfish. Mast cells contain granules packed with chemicals including histamine. Release of chemicals from granules leads to the allergic reactions. Mast cell tumors occur most frequently in the skin, but other sites include the liver, spleen, gastrointestinal tract and bone marrow.

Mast cell tumors vary in appearance. Some may look like raised bumps within, or just below the surface of, the skin. Others appear as red, ulcerated, bleeding, bruised, and/or swollen growths. Some tumors appear and remain the same size for months or years, while others show a rapid growth pattern over days or weeks. They can also increase and decrease in size over time. Tumors can be irritating and dogs will scratch, lick, or bite the mass and surrounding skin. This trauma causes the tumor cells to release the chemicals in their granules leading to a localized reaction. In more serious cases, the chemicals can affect the entire body, causing severe gastrointestinal bleeding and even an anaphylactic reaction, which can be fatal if untreated.

Mast cell tumors occur more frequently in retriever breeds and brachycephalic (flat-faced) breeds (Boxers, Boston Terriers, Pugs, and Bulldogs) but any breed can be affected.

WHAT ARE THE CLINICAL SIGNS?

The behavior of mast cell tumors is unpredictable. Many affected dogs have no signs other than the presence of the tumor. Other signs include scratching or biting at a skin mass, vomiting, diarrhea, bloody stool, lethargy, and/or decreased appetite. More severe signs are usually associated with a larger disease burden (e.g. internal spread). The most common locations of spread (metastasis) are local lymph nodes, liver, and spleen.

WHAT DIAGNOSTICS ARE PERFORMED?

A diagnosis can never be made from just observing the physical appearance or consistency of a skin growth. Confirmation of the diagnosis is usually done with a simple needle aspirate of the tumor. Additional diagnostics include sampling of local lymph nodes, abdominal ultrasound (+/- aspirates of liver and spleen), and bone marrow cytology. Biopsy with wide surgical excision is recommended to determine the grade of the tumor.

For tumors located internally, the diagnosis can be more challenging. An ultrasound or CT scan may be required to visualize the mass. In many cases an aspirate of the tumor can confirm the diagnosis, but a more invasive procedure (e.g. surgery) may be required to achieve a definitive answer.

A concurrent overall health evaluation includes a thorough physical exam (some dogs can have multiple skin tumors at the time of diagnosis), bloodwork, and urinalysis.

TREATMENT OPTIONS AVAILABLE AND PROGNOSIS:

Surgical removal is recommended for most skin mast cell tumors. This is true for dogs presenting with multiple tumors or dogs who develop more than one mast cell tumor over time. The tumor must be submitted to a pathologist for evaluation of two critical pieces of information: the grade of the tumor and whether or not the tumor was removed completely.

Tumor grade is reported as either low or high, a numerical value (e.g. grade I, grade II, or grade III), or most commonly both. High-grade/grade III tumors are more aggressive, with higher rates of regrowth after removal and higher chance of spread (metastasis). On the other hand, surgery alone can be curative for low-grade/grade I tumors. Grade II tumors can be either high or low-grade and are our biggest therapeutic challenge.

For most tumors, regardless of grade, additional therapy is recommended if the initial surgery was unsuccessful in removing the entire tumor. Options include a second surgery or radiation therapy. Chemotherapy can be used instead of surgery and/or radiation therapy to limit regrowth of an incompletely removed tumor, but the efficacy can be low. Chemotherapy plays a bigger role for preventing or delaying spread from the original tumor and is recommended for cases with documented metastasis (regardless of grade), for high-grade/grade III tumors, and for some grade II tumors. Chemotherapy is also used for dogs diagnosed with a primary tumor of an internal organ (e.g. spleen or gastrointestinal tract.)

The prognosis for skin mast cell tumors is variable and depends on the grade, extent of disease (stage), as well as ability to achieve adequate local control of the primary tumor. Metastasis, especially beyond a single local lymph node, indicates a more aggressive clinical course and cure is not usually possible. Dogs with spread to only the local lymph node may not have a worse prognosis if both the affected lymph node and the primary tumor are adequately removed. Tumors that arise primarily in the gastrointestinal tract, liver, or spleen carry a guarded prognosis and an aggressive clinical course is expected. The prognosis is typically only a few months.

Regardless of treatment plan, several medications are recommended to prevent side effects from tumor-related inflammation and release of chemicals from cells, which can lead to gastrointestinal ulceration. This includes antihistamines (diphenhydramine/Benadryl), antacids (famotidine/Pepcid or omeprazole/Prilosec), and corticosteroids (prednisone).

Dogs that develop one skin mast cell tumor are at risk for developing future mast cell tumors. These new tumors most commonly arise on their own rather than being related to any previous ones (i.e., they did not spread from a previously removed tumor). Dogs with multiple skin mast cell tumors may not have a worse prognosis than a dog with one if they are all low grade and can all be adequately removed. Active surveillance for any new lump or bump is essential in such cases, and early evaluation is recommended any dog with a skin mass.

WHAT ARE THE SIDE EFFECTS?

Side effects are associated with the treatment selected and the extent of disease and clinical signs. Recovery from anesthesia and brief hospitalization are required with any surgical procedure and risks include those associated with any form of anesthesia and surgery. Radiation therapy also includes the use of anesthesia and side effects depend on the area undergoing treatment. For skin tumors, localized redness and irritation is possible. If the radiation field were to encompass any internal organs, side effects can include temporary gastrointestinal upset (among other signs). Side effects of chemotherapy are infrequent and most commonly include temporary mild gastrointestinal upset such as vomiting or diarrhea. Decreased appetite and lethargy may also occur. Your pet will be prescribed supportive medications for nausea (should decreased appetite, or increased salivation, or drooling occur) and diarrhea for you to have on hand at home to use if necessary. It is best to be proactive with these medications and provide these as soon as signs are noted. Individual chemotherapy drugs also have potential for their own specific side effects which your pet's oncologist will discuss with you. The most common side effects from steroid therapy include increased urination, thirst, and hunger. Steroid doses are typically adjusted over time to reduce these effects. Other potential side effects include gastrointestinal upset (vomiting, diarrhea, dark or reddened stool associated with gastrointestinal bleeding) and systemic effects on the liver and kidneys. Blood work is used for monitoring and supportive medications can be provided to assist if side effects develop. Should you have any questions, your oncology team is available to assist.

CONCERNS OF CHEMOTHERAPY FOR MY PET?

Chemotherapy often carries a negative impression, especially with our understanding of chemotherapy in human medicine. Our approach to chemotherapy in veterinary medicine is focused on limiting severe side effects and providing increased quality of life. Chemotherapy in human medicine is provided with intent to cure by using very high doses which often result in increased side effects. As quality of life is imperative for our pets, doses are adjusted and your pet is monitored to limit severe side effects. Hair loss is rare except in certain breeds such as poodles. The majority of pets tolerate chemotherapy very well and are able to enjoy their normal lifestyle. However, there is a small percentage who have significant side effects with rare cases that require hospitalization. Whenever a pet does not tolerate chemotherapy well we are typically able to successfully adjust the dose and supportive medications to avoid such side effects in the future. Should you have concerns during therapy, speak with your oncologist in order to develop a tailored plan for your pet.

HOW DO I PREPARE?

We understand this is a difficult time and we are here to support you and your pet by providing the options and care necessary. Selecting a therapy is not binding and can be adjusted to you and your pet's needs. During treatment sessions, you will be provided with updates and any recommendations depending on your pet's response. Should any concerns arise, your oncology team will provide answers and help to guide you.

NAVIGATING THROUGH MY OPTIONS:

Treatment	Indication	Treatment Schedule	Cost
Surgery	Solitary tumors, multiple cutaneous tumors, +/- regional lymph node metastases	Pending further evaluation	~ $2,000 - $4,000
Radiation Therapy Definitive (post-operative)	Incompletely excised tumors	Daily treatments for 3 - 4 weeks	$4,500 - $6,000
Radiation Therapy Palliative	Non-resectable tumors	Varies	~$1,000 - $2,000
Chemotherapy: Vinblastine, Lomustine	High grade tumors, tumors with documented metastases, non-resectable tumors	IV and/or oral chemotherapy every one to three weeks	$300 - $400 per treatment
Chemotherapy: Tyrosine Kinase Inhibitors (Palladia)	High grade tumors, tumors with documented metastases, non-resectable tumors	Oral medication given at home every other day or three times per week	$300 - $650 per month (depending on pet's weight)
Steroids	Typically palliative	Oral medication daily with intermittent bloodwork for monitoring	$30 - $200 per month

Cost estimates are based on individual appointments and overall cost is dependent on patient response and does not include additional supportive care or hospitalization, if required.

GETTING STARTED

Once you have determined the best therapeutic option for your pet, you may work with our oncology team to develop an appointment plan.

Scheduling: Appointments for patients undergoing treatments and rechecks should be scheduled in advanced. You are responsible for making this appointment with the front desk:

- Schedule your appointments at reception upon check out
- Drop offs are requested between 7:30-8:30am
- Pick ups are requested by 4:30pm

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