

## INTRODUCTION

Mast cell tumors (MCT) are a very common form of cancer diagnosed in dogs. They most commonly occur in the skin, but can also be found in the spleen, liver, lymph nodes, and bone marrow.

- Mast cells are normal cells in the body that are specialized to create chemicals that respond to inflammation and allergies (very similar to your reaction to a bee sting). Mast cell tumors develop when one of these cells multiplies and grows abnormally.
- In most cases, mast cell tumors of the skin act in a benign manner. Boxers, Pugs, and Pit Bulls tend to be more predisposed than other breeds, but these tumors also tend to be more benign in these breeds.



A recurrent grade II mast cell tumor in the perineal region of an 8 year old Golden Retriever. This lesion recurred following initial surgical resection.

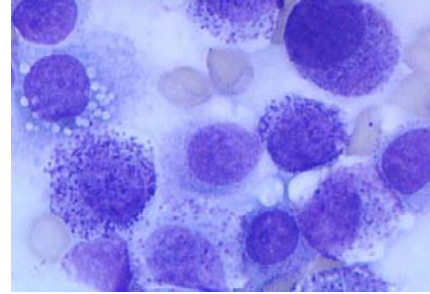
## CLINICAL SIGNS

Often, mast cell tumors are first noticed when a lump is found on the skin and may wax and wane in size over time. Less commonly seen include decreased appetite, vomiting, abdominal pain, and diarrhea (may be black, tarry stools). These signs are associated with the chemicals (histamine) released from the degranulating mast cells.

## DIAGNOSIS/STAGING

- In order to obtain an initial diagnosis, cytology, involving fine needle aspirates of the suspected mass, should be considered.
- There are 3 grades of mast cell tumors, and a biopsy is needed to determine the grade of the tumor. A biopsy can be obtained via an incisional biopsy (a small portion of the tumor is removed), or with surgical removal of the tumor (therapeutic intent). Wide surgical margins are

needed for this particular tumor to ensure complete removal, but this is not always possible, and further treatments may be indicated.



- As stated above, mast cell tumors are divided into three grades.
- Grade 1 MCTs are usually benign in nature and most are cured with surgery alone even if incompletely excised. The metastatic rate of grade I MCT is less than 10%.
- Grade 2 MCTs are the intermediate grade and also the most common (representing ~ 80% of MCTs). These tumors have a metastatic rate of ~25%, and can either act like a grade 1 or grade 3. Further diagnostics are usually recommended for grade 2 tumors to determine their biological nature. There are special stains that can be performed on the biopsy sample that will help further predict tumor behavior and dictate prognosis and treatment options.
- Grade 3 MCTs are the most malignant and aggressive and have a metastatic rate of approximately 50%. Chemotherapy is almost always recommended for grade 3 tumors.
- In addition to the biopsy, staging is also recommended to determine the extent of disease. Current blood-work (CBC/chemistry profile) and a urinalysis is recommended to evaluate your pet's overall health status. Radiographs of the thorax and abdomen are used to look for any enlarged lymph nodes in the chest and abdomen, respectively. An abdominal ultrasound may be recommended if the radiographs are suspicious for disease. Fine needle aspirates of regional lymph nodes or abnormal abdominal organs may also be performed to look for any further evidence of metastasis.

The Oncology Service, LLC

[www.theoncologyservice.com](http://www.theoncologyservice.com)

At Friendship Hospital for Animals  
4105 Brandywine Street, NW  
Washington, DC 20016  
T 202.363.7300  
F 202.243.7081

At The Life Centre  
165 Fort Evans Road NE  
Leesburg, VA 20176  
T 571.439.6655  
F 703.738.7307

Animal Clinical Investigation, LLC

[www.animalci.com](http://www.animalci.com)

4926 Wisconsin Avenue, NW  
Washington DC 20016



## TREATMENTS

There are 3 traditional treatment options that are available. These options can be used alone or in combination. Generally, a combination of 2 or more of these options can produce the best tumor control.

1. **Surgical removal:** This must be done with wide margins to prevent recurrence of disease. A minimum of 2cm margins laterally and 1 facial plane deep is recommended. Depending on the location, wide surgical margins may not be possible. Even with complete surgical removal, new MCTs can occur elsewhere on the body, either related or unrelated to the current tumor.
2. **Radiation therapy (RT):** RT has a relatively high success rate at curing grade 1 and 2 MCTs when following incomplete surgical removal (tumor control at 1 year is 90-95%). Side effects are largely limited to the area that is receiving radiation therapy. About 50-70% of grade 2 mast cell tumors will NOT recur, even if microscopic evidence of tumor persists following surgery. RT may be successful in 50% of cases where gross disease exists and surgery is not feasible.
3. **Chemotherapy:** For dogs that are at high risk for mast cell tumor spread (i.e. high grade 2 or grade 3 tumors) or dogs with established disease at multiple sites, systemic treatment with chemotherapy is recommended. Chemotherapy options for mast cell tumors include lomustine (CCNU), vinblastine, and L-asparaginase. These drugs have a 40-70% chance of benefit. Side effects are generally mild and depend on the presentation of each case.
4. **Tyrosine kinase inhibitors:** (Palladia) This oral drug has been recently approved by the FDA for treatment of canine mast cell disease. The activity of these agents is best in more aggressive forms of mast cell disease that show a receptor mutation (60% response rate vs. 35% response rate without mutation). Side effects are mild and can be managed with changes in the frequency and the dose of therapy.

5. **Corticosteroids:** Corticosteroids are commonly used in this disease, either alone (oral or intralesionally) or most often in combination with the chemotherapy agents. The benefit provided by steroids alone may be short-lived, and their effects are highly variable amongst dogs.
6. **Benadryl and Pepcid:** These medications help mitigate side effects associated with histamine release from mast cells. Dogs that present with vomiting, anorexia, diarrhea, or those with large or unresected tumors will most benefit from these medications,.

## CONCLUSION

The prognosis for dogs with mast cell tumors depends on the grade and stage (extent of disease). A successful wide first surgery is the most valuable prognostic factor for mast cell tumors. The use of radiation therapy, chemotherapy, or other novel therapies can lower the rate of recurrence. With treatment, dogs can often live normal happy lives.

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