

# Mast Cell Tumors in Dogs

## Quick Facts at a Glance

- 20-25% of all skin/subcutaneous tumors in dogs are mast cell tumors (MCT)
- 10-15% of canine MCT are clinically indistinguishable from benign fatty tumors
- Definitive diagnosis of MCT cannot be made without needle aspirate or biopsy evaluation of the lesion
- Behavior of individual MCTs is difficult to predict but should always be considered aggressive until proven otherwise
- MCT of the anal, inner thigh and ear regions tend to behave more aggressively than their tumor grade would predict
- 20% of dogs with MCT will have multiple primary tumors in their lifetime
- Aggressive surgical resection remains the cornerstone of treatment

## What are the clinical features?

Mast cell tumors in dogs occur primarily as either a skin or subcutaneous mass. It is important to remember that mast cell tumors are extremely variable in their clinical presentation. They can resemble any other type of skin or subcutaneous tumor, both benign (i.e. fatty mass) and malignant. Most canine MCT are solitary although multiple primary tumors develop in 20% of patients. Approximately 50% of canine MCT are located on the trunk and perineum, 40% on the extremities and 10% on the head and neck.

Regional lymph node enlargement may occur when high-grade mast cell tumors metastasize (spread) to draining lymph nodes. Liver and spleen enlargement are features of advanced stage, metastatic MCT.

## Diagnosis

**The diagnosis of MCT is often made simply with microscopic evaluation of a needle aspirate of the mass. Unfortunately, it provides little prognostic information. Biopsy allows us to grade the tumor so we can predict biologic behavior and make appropriate treatment recommendations. There are 3 grades of MCTs determined by the biopsy.**

### Survival Times of Dogs After Surgery Based on Histologic (Biopsied) Grade

Grade	#of Dogs	Alive 6 Months Post-Surgery
I	39	77
II	30	45
III	45	13

## Prednisone prior to surgery

We may place your pet on prednisone and benadryl before and after the surgery to help shrink the tumor. This is not a cure, but will decrease the inflammation around the tumor and reduce the amount of tissue we need to remove at the time of surgery.

## **Initial Biopsy**

It is important to do a small biopsy of the mass prior to complete removal. Grade I tumors do not require large margins, while grades II and III need a wide incision. These biopsies can usually be performed with light sedation and a local numbing block of the area.

## **Surgery: 3cm margins!!!**

The most frustrating feature of MCT is how aggressively they can behave, regardless of their appearance and biopsy grade. MCT are notorious for their invasive nature and tendency to extend far beyond visible margins. If 2-3 cm surgical margins, both lateral and deep, are not obtained then chances are good that the tumor may not be completely removed. While it may be difficult to remove 2-3 cm deep margins in a patient without much body fat, removing a layer of muscle below the tumor is advised. A surgical margin of several millimeters is usually not adequate, unless you have a grade 1 tumor.

Depending on where the tumor is located, it may not be possible to obtain 3 cm surgical margins (i.e. leg). In those cases, it is appropriate to perform surgery followed immediately by radiation therapy. Radiation therapy in this setting can be highly effective at achieving long-term local control. Depending on the situation, chemotherapy may be recommended in conjunction with or in lieu of radiation therapy.

## **What about lymph nodes?**

Whenever possible, the draining lymph nodes (lymph nodes in close proximity) should be biopsied,, regardless of gross appearance and tumor grade. The presence of lymph node metastasis worsens the prognosis and necessitates treatment with chemotherapy.

## **When is it essential to stage the patient with mast cell tumor?**

Staging is essential prior to undergoing an extensive or expensive treatment procedure (i.e. amputation, chemo or radiation therapy). Staging is also recommended for any grade III or high-grade II MCT, even if completely excised with wide margins.

Diagnostic tests performed in the staging of MCTs include cytology or biopsy of the draining lymph node, abdominal ultrasound with ultrasound guided aspirate and cytology of the spleen and liver, bone marrow aspirate and cytology, complete blood count (CBC) and chest radiographs. Although the staging process can provide us with essential information, we are very limited by the low sensitivity of these diagnostic tests. In the case of a grade I or low grade II MCT that has been completely excised with wide surgical margins, it is unlikely that metastasis has occurred. Early metastasis would not likely be detected during the staging process.

## **Radiation therapy**

Mast cell tumors are generally very sensitive to radiation. Radiation is most effective at achieving long-term (greater than 5 years) tumor control when it is delivered to microscopic disease, grade 2 intermediate or lower and in a well-defined radiation field. Radiation therapy can be used to control local disease after incomplete resection of high-grade 2 or grade 3 MCT. The size of the tumor prior to surgical resection has great impact on the effectiveness of radiation.

## Chemotherapy: When to treat?

As with any cancer, chemotherapy for the treatment of MCT is most effective when combined with other treatment modalities or used early in the course of the disease. Chemotherapy will not be helpful in the treatment of a large mast cell tumor that cannot be excised and has become resistant to prednisone therapy. Chemotherapy is appropriate when tumor cells extend to surgical margins and a second surgery and radiation therapy are not feasible treatment options. Chemotherapy is recommended in all cases with lymph node involvement. Chemotherapy is recommended for all patients with high-grade II or grade III MCT, even when the tumor is excised with wide margins.

Prednisone, vinblastine and lomustine are used in combination to obtain the best results with minimal side effects. Chemotherapy results in survival times of greater than 2 years in patients with high-grade II MCT with metastasis to regional lymph nodes that have been treated with aggressive surgical resection resulting in complete resection and are negative for internal organ metastasis.

Cancer therapies are constantly evolving...do not hesitate to ask us about any new treatments available.

Please note: While CVAH performs needle aspirates, surgery and biopsies to grade and remove MCT's, we do not administer chemo or radiation therapy and will refer you to the Cancer Specialists at the Veterinary Referral Center. They are a renowned and state of the art facility and will work with you to determine what is best for you and your dog. Their website is <http://vrcc.com/oncology>.