



# ACVIM

Oncology  
Fact Sheet

## **ACVIM Fact Sheet: Mast Cell Tumors**

### ***Overview***

Mast cell tumors (MCT) represent a cancer of mast cells, which are a type of white blood cell involved in allergy and inflammation. Mast cell tumors are the most common skin tumor in dogs. Older dogs are most commonly affected. Some predisposed breeds of dogs include Boxers, Boston terriers, Bulldogs, pugs, Labrador retrievers, golden retrievers, Weimaraners, Rhodesian Ridgebacks, cocker spaniels, schnauzers, Staffordshire Terriers, beagles and Shar Peis.

Mast cells contain granules filled with substances that can be released into the bloodstream. In large amounts, these substances can cause systemic complications including stomach ulceration and bleeding and low blood pressure.

The cause of MCT remains unknown. Because certain breeds of dogs are predisposed to this cancer, genetics are thought to play a role. Additionally, there are known molecular abnormalities associated with MCT. Chronic inflammation may also play a role.

### ***Signs & Symptoms***

Mast cell tumors can vary in appearance. These tumors typically presents as a lump on or under the skin. The lump can be hairless or covered by hair, and/or red, ulcerated or swollen. These lumps are often itchy. A history of waxing and waning size of the tumor can be reported. This is due to the fact that mast cells contain histamine in their granules and this can be released to cause swelling.

Some MCT can have a more benign-type of behavior where the tumor is present for months to years without change in size or a more aggressive behavior where growth occurs rapidly. If these tumors spread, the typical pattern is first local lymph nodes near the tumor followed by liver and spleen.

### ***Diagnosis***

Initial evaluation of a skin mass tends to start with a fine needle aspirate. This is a non-invasive method to extract cells from a mass to obtain a diagnosis. Following diagnosis of MCT, additional diagnostics performed include blood work, fine needle aspirate of the local lymph node, abdominal ultrasound, and chest radiograph (x-rays).

### ***Treatment & Aftercare***

Surgical removal of the MCT is the treatment of choice. This allows for removal of the mass and also allows for information about prognosis.

Prior to surgery, patients are often placed on antihistamines, such as Benadryl, and antacids, such as Pepcid AC or Prilosec, to alleviate side effects from the histamine that is present in the MCT granules.

The most important considerations when determining if a patient needs additional treatment following surgery are tumor grade, completeness of surgical margins, and whether the MCT has spread or not.

Following removal of the MCT, the tissue is submitted to a pathologist at a diagnostic laboratory so that the entire tumor can be evaluated. The pathologist will assess certain microscopic features of the MCT to determine the tumor grade. The grade is one of the best prognostic factors for MCT. These tumors behave differently in the body (i.e., propensity to spread) depending on the grade of the tumor. The MCT grade cannot be determined without tissue evaluation (biopsy). This is why grade is not provided following a fine needle aspirate where only cells are obtained, but not tissue.

Mast cell tumors are classified as one of three different histologic grades (grades I, II, and III). Grade I MCT act in a benign manner, and most can be cured with surgical removal. Grade III MCT are more aggressive tumors that are locally invasive and have a high rate of spread (50-90%).

Grade II MCT are a more difficult group to assess because some behave more like grade I and some behave more like grade III MCT. A feature known as mitotic index is used to better determine the behavior of a grade II MCT. The mitotic index is a measure of proliferation (i.e., how fast the cells are dividing and populating). A mitotic index  $\leq 5$  is considered a good prognosis and these can be treated as a grade I mast cell tumor, but a grade 2 mast cell tumor with a mitotic index  $> 5$  should be treated like a grade 3 mast cell tumor. Again, a surgical biopsy is required to ascertain the grade of the MCT. However there can be many indications of possible grade based on history of the tumor, location of the tumor, whether the patient is sick or feeling healthy, and breed of the canine patient.

Chemotherapy following surgery is indicated if the MCT is found to be a grade III or a grade II with a high mitotic index because these types of mast cell tumors have a high rate of spread to other organs.

Another important feature of the biopsy report for MCT is whether or not the tumor has been completely excised. When surgery is performed on these tumors, it is important to ensure the entire mass is removed because the tumor can recur (regrow) at the surgical site if cancer cells are left behind. A second surgery or radiation therapy may be required if the surgical margins are not clean, meaning that cancer cells are left behind at the site of surgery.

### ***Prognosis***

The prognosis for MCT depends upon the tumor grade, whether surgery has resulted in complete tumor removal, and whether the MCT has spread or not.

Mast cell tumors that are completely removed, that are a grade I or grade II with low mitotic index, and free of metastasis is excellent. The prognosis is fair with aggressive treatment for more advanced grade MCT.

Dogs that have had a MCT are at risk of developing additional MCT in the future. These MCT do not represent spread, but represent separate tumors. Early tumor detection and treatment can aid in improving treatment outcome and prognosis.

***Comparative Information:***

Feline mast cell tumors of the skin tend to have a more benign nature as compared to mast cell tumors in dogs and can often be cured with complete tumor removal. Mast cell disease within the internal organs of cats has a more aggressive disease course. Please consult with a board certified veterinary oncologist to determine if additional therapy is indicated for a cat that has been diagnosed with mast cell disease.

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