



# MAST CELL TUMOURS

## What are Mast Cell Tumours?

Cancerous (known as “malignant”) round cell tumour; round cell tumours are made up of cells that appear round or oval on microscopic examination; mast-cell tumours are one type of round cell tumour. Tumour arising from mast cells; “Cutaneous” refers to the skin.

Mast cells are connective tissue cells that contain very dark granules; the granules contain various chemicals, including histamine; they are involved in immune reactions and inflammation; mast cells can be found in various tissues throughout the body. Mast-cell tumours in dogs are graded as well differentiated or low grade (Grade 1), intermediately differentiated (Grade 2), and poorly differentiated, undifferentiated or high grade (Grade 3); in general, the more differentiated the mast-cell tumour, the better the prognosis.

Differentiation is a determination of how much a particular tumour cell looks like a normal cell; the more differentiated, the more like the normal cell. Mast-cell tumours of the skin in cats are classified as “compact” (more benign behaviour) or “diffuse” (more undifferentiated and aggressive). Mast-cell tumours are the most common cancerous (malignant) skin tumour in the dog and are the most common tumour found in the spleen of cats.

Mast-cell tumours also may be found in the tissue immediately beneath the skin (that is, the subcutis), spleen, liver, and intestines. The tumours can release histamine, leading to the development of hives, reddening of the skin (known as “erythema”), bleeding and bruising, which can be seen around the tumour.

## Breeds Affected & Mean Age Range

- Dogs— short-nosed, flat-faced (known as “brachycephalic”) breeds, such as Boxers, Boston Terriers, Bulldogs, and Pugs as well as Golden Retrievers, Labrador Retrievers, Rhodesian Ridgebacks, Beagles, Staffordshire Bull Terriers, Weimaraners, Chinese shar-peis, and Australian cattle dogs
- Cats—Siamese
- Dogs—middle-aged, range 4 months-18 years of age
- Cats—middle-aged, 8-9 years of age for mast-cell tumours affecting the skin (known as “cutaneous mastocytoma”) and older cats for mast-cell tumours found in the intestines or spleen
- Cats—histiocytic form of mast-cell tumours of the skin (cutaneous mast-cell tumour) occurs in young cats, mean age of 2.4 years

## Clinical Signs

Depends on the location and grade of the tumour.

### Dogs

- Tumour on the skin or under the skin (known as “subcutaneous” or “subcutis”), may have been present for days to months
- Mast-cell tumours may be present within fatty tumours (known as “lipomas”)
- Tumour may have appeared to fluctuate in size
- Recent rapid growth after months of inactive or subtle growth is common
- Recent onset of redness (known as “erythema”) and fluid build-up (known as “oedema”) most common with high-grade skin and subcutaneous tumours
- Fluid build-up (oedema) may be seen in the area around a tumour that has released histamine and other chemicals (known as “degranulation”)
- Lymph nodes may be enlarged in or near the area of the tumour (known as “regional lymphadenopathy”)—may develop when a high-grade tumour spreads (metastasizes) to the lymph nodes
- Systemic illness with advanced local or generalized disease; may see vomiting; lack of appetite (known as “anorexia”), weight loss, and black, tarry stools (due to the presence of digested blood; condition known as “melena”)

### Cats

- Lack of appetite (known as “anorexia”)—most common complaint with mast-cell tumour of the spleen
- Vomiting and diarrhoea—may occur secondary to mast-cell tumours of the spleen or gastrointestinal tract
- Long-term (chronic) weight loss
- Sluggishness (lethargy)
- Mast-cell tumour of the spleen—enlarged spleen (splenomegaly)
- Intestinal mast-cell tumour—firm, segmental thickenings of the small intestinal wall; spread (metastasis) to the mesenteric lymph nodes, spleen, liver, and (rarely) lungs

## Treatment

### Dogs

- Surgical removal (excision) of the mast-cell tumour and surrounding tissue—treatment of choice
- Conventional recommendations that surgical removal include wide margins (2–3 cm) around the tumour may be unnecessary with Grade 2 mast-cell tumours, as the majority of cases with so-called “dirty margins” (where tumour cells are found by microscopic examination in the edges of the surgically removed tissue) fail to have regrowth of the tumour at the surgical site
- Microscopic evaluation of the entire surgically removed tissue—essential to predict the biologic behaviour of the tumour and to grade the tumour  
Lymph-node involvement—surgical removal of the affected lymph node(s) and the primary tumour; follow-up chemotherapy may be useful
- Radiation therapy—treatment option for mast-cell tumour of the skin that is incompletely removed surgically and in a location that does not allow aggressive surgical removal or in cases where another surgery is not possible
- Radiation therapy can be used to treat entire tumour, but severe reactions are possible

### Cats

- Surgery—treatment of choice for mast-cell tumours of the skin; only narrow margins around the removed tumour are necessary, as the majority of tumours do not regrow following narrow surgical margin tumour removal
- Surgical removal of the spleen (known as “splenectomy”)—treatment of choice for mast-cell tumours of the spleen; splenectomy is recommended in cats with large tumour burden in the abdomen, despite spread of the cancer (metastasis)

## What Medication is available?

### Dogs

- *Vinblastine and prednisone*
- *Vinblastine only*
- *Lomustine*
- *Torcerinib*
- *Masitinib*

### Cats

- *Lomustine*
- *Vinblastine*

**Dogs & Cats:** Symptomatic treatment—Benadryl; famotidine or other histamine-blocking (H<sub>2</sub>) agents; omeprazole and sucralfate should be considered for any dog or cat with gross mast-cell disease.

## Possible Complications

- Low white blood cell count (known as “leucopenia”) due to suppression of the bone marrow (known as “myelosuppression”) secondary to chemotherapy
- Liver toxicity (known as “hepatotoxicity”)

## Follow Up Care

- Evaluate any new masses microscopically
- Evaluate regional lymph nodes at regular intervals to detect spread (metastasis)
- Check complete blood count (CBC) at regular intervals, if the pet is receiving chemotherapy
- Check liver enzymes on serum biochemistry profile, if the pet is on certain chemotherapy drug protocols (such as lomustine therapy)

### Dogs

- Grade 1 or 2—complete surgical removal should be curative in the majority of affected pets
- Grade 2 (high)—complete surgical removal evaluated every 3 months for 1 year with physical examination, abdominal ultrasound, and lymph-node assessment
- High-grade tumours (Grade 3 or those in a location associated with a negative prognosis)—physical examination, bloodwork (such as complete blood count [CBC] and serum biochemistry profile) and abdominal ultrasound every 2 months for 1 year and then every 6 months for an additional 2 years

### Cats

- Abdominal, including mast-cell tumour involving the intestine or spleen—abdominal ultrasound every 3 months for 1 year

## Expected Prognosis

- complete surgical removal (excision) of low-grade mast-cell tumours in most locations is curative
- Complete surgical removal (excision) of high-grade mast-cell tumours or those located in areas associated with a poor prognosis (mucocutaneous junctions [areas where skin and moist tissues of the body come together; for example, the lips]), possibly inguinal regions) often require chemotherapy; median survival times averages approximately 11–12 months
- Incomplete surgical removal (excision) of a low-grade mast-cell tumour may require additional local therapy with another surgery (often cured) or radiation therapy (85% disease-free at 3 years)
- Incomplete surgical removal (excision) of a high-grade mast-cell tumour requires additional local therapy, in addition to chemotherapy; median survival times range from 6 to 12 months
- Spread of the cancer to lymph nodes in the area of the tumour (regional metastasis) should be treated with surgical removal (excision) of the affected lymph node(s) at the time of the primary tumour removal; chemotherapy is necessary; median survival times are typically less than 9 months
- Spread of the cancer to lymph nodes located away from the tumour or other organs (known as “distant metastasis”) often is treated with chemotherapy or ancillary therapies alone with a median survival of 4 months or less