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Mast Cell Tumor

Issue Description

A mast cell tumor is a type of tumor consisting of mast cells that is found in many species of animals. Up to 20 to 25 percent of skin tumors in dogs are mast cell tumors, with a similar number in cats.

Other Names

Mastocytoma

Causes

A mast cell originates from the bone marrow and is normally found throughout the connective tissue of the body. It is a normal component of the immune system and as it releases histamine it is associated with allergic reactions. Mast cells also respond to tissue trauma. Mast cell granules contain histamine, heparin, platelet-activating factor, and other substances. Disseminated mastocytosis is rarely seen in young dogs and cats, while mast cell tumors are a common malignant tumor of the skin in older dogs and cats.

Commonly Affected Breeds

- Boxer
- Bulldog
- Basset Hound
- Weimaraner
- Boston Terrier
- Golden Retriever
- Labrador Retriever
- Beagle
- German Shorthaired Pointer
- Scottish Terrier
- Pug
- Rhodesian Ridgeback

Symptoms

Mast cell tumors are known amongst veterinary oncologists as "the great pretenders" because their appearance can be varied, from a wart-like nodule to a soft subcutaneous lump (similar on palpation to a benign lipoma) to an ulcerated skin mass. All lumps should be checked by fine needle aspiration: palpation or visual inspection is never adequate. Most mast cell tumors are small, raised lumps on the skin. They may be hairless, ulcerated, or itchy. They are usually solitary, but in about 6 percent of cases there are multiple mast cell tumors (especially in Boxers and Pugs).

Manipulation of the tumor may result in redness and swelling from release of mast cell granules, also known as Darier's sign, and prolonged local hemorrhage. In rare cases a highly malignant tumor is present, and signs may include loss of appetite, vomiting, diarrhea, and anemia. The presence of these signs usually indicates mastocytosis, which is the spread of mast cells throughout the body. Release of a large amount of histamine at one time can result in ulceration of the stomach and duodenum (present in up to 25 percent of cases), or disseminated intravascular coagulation. When metastasis does occur, it is usually to the liver, spleen, lymph nodes and bone marrow.

Diagnosis

A needle aspiration biopsy of the tumor will typically show a large number of mast cells. This is sufficient to make the diagnosis of a mast cell tumor, although poorly differentiated mast cells may have few granules and thus difficult to identify. The granules of the mast cell stain blue to dark purple with a Romanowsky stain, and the cells are medium sized. However, a surgical biopsy is required to find the grade of the tumor. The grade depends on how well the mast cells are differentiated, mitotic activity, location within the skin, invasiveness, and the presence of inflammation or necrosis.

- Grade I - well differentiated and mature cells with a low potential for metastasis
- Grade II - intermediately differentiated cells with potential for local invasion and moderate metastatic behavior
- Grade III - undifferentiated, immature cells with a high potential for metastasis

However, there is a significant amount of discordance between veterinary pathologists in assigning grades to mast cell tumors due to imprecise criteria.

The disease is also staged:

- Stage I - a single skin tumor with no spread to lymph nodes
- Stage II - a single skin tumor with spread to lymph nodes in the surrounding area
- Stage III - multiple skin tumors or a large tumor invading deep to the skin with or without lymph node involvement
- Stage IV - a tumor with metastasis to the spleen, liver, bone marrow, or with the presence of mast cells in the blood

X-rays, ultrasound, or lymph node, bone marrow, or organ biopsies may be necessary to stage the disease.

Treatment And Prognosis

Removal of the mast cell tumor through surgery is the treatment of choice. Antihistamines such as diphenhydramine are given prior to surgery to protect against the effects of histamine released from the tumor. Wide margins (two to three centimeters) are required because of the tendency for the tumor cells to be spread out around the tumor. If complete removal is not possible due to the size or location, additional treatment such as radiation therapy or chemotherapy may be necessary. Prednisone is often used to shrink the remaining tumor portion. H2 blockers such as cimetidine protect against stomach damage from histamine. Vinblastine and CCNU are common chemotherapy agents used to treat mast cell tumors.

Mast cell tumors that are grade I or II that can be completely removed have a good prognosis. One study showed that about 23 percent of incompletely removed grade II tumors recurred locally. Any mast cell tumor found in the gastrointestinal tract, paw, or on the muzzle has a guarded prognosis. Previous beliefs that tumors in the groin or perineum carried a worse prognosis have been discounted. Tumors that have spread to the lymph nodes or other parts of the body have a poor prognosis. Any dog showing symptoms of mastocytosis or with a grade III tumor has a poor prognosis. Boxers have a better than average prognosis because of the relatively benign behavior of their mast cell tumors. Multiple tumors that are treated similarly to solitary tumors do not seem to have a worse prognosis.

Mast cell tumors do not necessarily follow the histological prognosis. Further prognostic information can be provided by AgNOR stain of histological or cytological specimen. Even then there is a risk of unpredictable behavior.

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