Mast Cell Tumors

Drs. Foster & Smith Educational Staff

Canine mast cell tumors account for up to 20% of all skin tumors in dogs. While they often appear small and somewhat insignificant, they can be a very serious form of cancer in the dog. Some mast cell tumors are easily removed without the development of any further problems and others can lead to a life threatening disease. Proper identification and treatment are very important in controlling these tumors.

What are mast cells?

Mast cells are cells that normally occur in the skin and other tissues, such as the intestines and respiratory tract. They are part of the immune system (defense mechanism) of the body. They contain large amounts of histamine, heparin, and proteolytic enzymes (enzymes which break down protein). These can be toxic to foreign invaders, such as parasites, and are released when the mast cell is triggered by the immune system.

A mast cell tumor is formed from many of these mast cells. Because of the histamine, heparin, and enzymes present in mast cell tumors, they can create problems when damaged or removed. Large amounts of these substances can be released into the body and have significant effects on heart rate, blood pressure, and other body functions. Sites where the tumors are removed can sometimes refuse to heal and can become difficult to manage.

Which dogs are at risk for developing mast cell tumors?

Mast cell tumors can develop in all ages and breeds of dogs. They are rare in cats and humans. There appears to be a hereditary factor to these tumors as shown by some strong breed predilections. They are most common in Boxers, Boston Terriers, Pugs, English Bulldogs, and other brachiocephalic breeds (those having a short, wide head). Golden Retrievers may also be at increased risk. Most mast cell tumors develop in older dogs, usually those 8.5 - 9.5 years of age.

The exact cause of mast cell tumors is still speculative. A viral source has been mentioned, as well as hereditary and environmental factors. It is quite possible that there are a variety of different causes for the development of this tumor. Because this tumor is not found in humans, there has not been as much research and information available for the veterinarian as there are for tumors that are found in both humans and animals.

What are the symptoms of mast cell tumors?

The appearance of mast cell tumors can be widely variable. They can be either benign or malignant and can be found on any part of the body. They are found most commonly on the trunk, limbs, and perineal (genital) area. Tumors can be found on the skin or in the underlying or subcutaneous tissue. They can be single or multiple and can be smooth, bumpy, or even ulcerated ulcerated

Systemic signs, such as vomiting, duodenal ulcers, blood in the stool, and abnormalities in blood clotting occur in some dogs with mast cell tumors. These signs result from the release of histamine, etc. from the active mast cell tumors.

How are mast cell tumors diagnosed?

Since they occur in a variety of shapes and locations, a biopsy or needle aspirate (collecting some tumor cells through a needle and examining them under the microscope) is necessary to properly identify a growth as a mast cell tumor.

Mast cell tumors are commonly graded and staged, meaning classified as to how they are expected to behave. This is performed by examining the tumor after it has been removed. The grading and staging help determine what type of further treatment may be necessary and the prognosis.

Grading Mast Cell Tumors

Mast cell tumors are "graded" as to how likely they are to be malignant. The higher the grade, the more serious the tumor.

- Grade I: Occur in the skin and are considered benign. Although they may be large and difficult to remove, they tend to not spread to other areas of the body. Most mast cell tumors are Grade I.
- Grade II: Extend below the skin into the subcutaneous tissues. Their cells show some characteristics of malignancy and their response to treatment can be unpredictable.
- Grade III: Invade areas deep below the skin, are very aggressive, and require more involved treatment.

Staging Mast Cell Tumors

In addition to grading mast cell tumors, they are also staged, which is a measurement of how they have spread in the body. A tumor is staged after it is surgically removed and examined, along with the neighboring lymph nodes. Staging is based on how many tumors were present, the lymph node involvement, and if all of the tumor was removed.

- Stage 0: One tumor in the skin incompletely removed, with no lymph node involvement.
- Stage I: One tumor in the skin, with no lymph node involvement.
- Stage II: One tumor in the skin with lymph node involvement
- Stage III: Multiple large, deep skin tumors, with or without lymph node involvement
- Stage IV: One or more tumors with metastasis in the skin with lymph node involvement. This stage is subdivided into

*Unauthorized use of any images, thumbnails, illustrations, descriptions, article content, or registered trademarks of **Foster & Smith, Inc.** is strictly prohibited under copyright law. Site content, including photography, descriptions, pricing, promotions, and availability are subject to change without notice. These restrictions are necessary in order to protect not only our copyrighted intellectual property, but also the health of pets, since articles or images that are altered or edited after download could result in misinformation that may harm companion animals, aquatic life, or native species.*

those that have no other signs (substage a) and those that do have some other clinical signs (substage b).

How are mast cell tumors treated?

In determining the appropriate therapy for mast cell tumors and their wide variety of forms, it is important to remember that each animal needs to be evaluated and treated individually.

Surgical Removal

Mast cell tumors are usually treated by surgical removal. This is the treatment of choice, and if performed correctly, will usually cure Grade I and Grade II tumors. It is important that the tumor is carefully removed and a large area of 'healthy' tissue around the tumor is also removed. It is sometimes difficult to determine exactly where the tumor begins and healthy tissue starts, so a wide margin (large portion of healthy tissue around the tumor, at least one inch) should be removed along with the tumor.

Radiation

In some cases, surgical removal may not be an option, or it may not be possible to remove enough margin around a tumor. In these instances, radiation is recommended. Radiation therapy after surgical removal appears to be beneficial and may reduce the incidence of reoccurrence and increase survival rates. Radiation is most useful when the tumors have not spread to multiple areas of the body.

Chemotherapy

If the mast cell tumors have spread to multiple areas, a combination of anti-cancer drugs is commonly used along with surgery and radiation. These include vinblastine, lomustine, and corticosteroids, such as prednisolone. Unfortunately, mast cell tumors do not respond as well to these drugs as other cancers may.

There are two specific medications available to treat mast cell tumors in dogs. They are in a class of drugs called tyrosine kinase inhibitors. The brand names of the drugs are Palladia and Kinavet-CA1. They are both oral prescription medications designed to treat grade II-III mast cell tumors. There are some strict warnings and handling instructions with these medications so they should only be administered to dogs that are under a veterinarian's care.

What is the prognosis for dogs with mast cell tumors?

The prognosis depends primarily upon the grade and stage of the tumor. The lower the grade, the better prognosis. In addition, dogs with Stage I tumors have the best prognosis, compared to those staged higher. The location of the tumor also plays a role. Dogs with tumors on the limbs appear to have the best prognosis. Those with tumors in the nail bed, genital areas, muzzle, and mouth have a poorer prognosis. Dogs with mast cell tumors in the internal organs, such as the spleen or bone marrow, have the least favorable prognosis.

Conclusion

Mast cell tumors can present in a wide variety of ways and can have an equally varied set of symptoms and outcomes. Because it is difficult to diagnose a mast cell tumor by visual inspection, it is important that all suspicious-looking skin tumors be examined by a veterinarian and followed up with diagnostic testing and identification. Treatment consists of surgical removal and radiation, and possibly chemotherapy. As with all tumors, prompt recognition and treatment is very important in obtaining the best possible outcome.

*Unauthorized use of any images, thumbnails, illustrations, descriptions, article content, or registered trademarks of **Foster & Smith, Inc.** is strictly prohibited under copyright law. Site content, including photography, descriptions, pricing, promotions, and availability are subject to change without notice. These restrictions are necessary in order to protect not only our copyrighted intellectual property, but also the health of pets, since articles or images that are altered or edited after download could result in misinformation that may harm companion animals, aquatic life, or native species.*