

Mast Cell Tumors of the Viscera

Mast cell biology

Mast cells originate in the bone marrow but only mature in peripheral tissues. They are found in all tissues of the body but most are near surfaces in contact with the external environment such as the skin, respiratory and digestive tracts. Mast cells produce many chemicals with differing effects on the body (histamine, proteoglycans, neutral proteases and chemotactic growth factors). These chemicals are present in granules in the cytoplasm of mast cells. They are discharged from the cells in response to various stimuli, and they induce inflammatory reactions. Mast cells also interact with cells of the immune system producing antibodies involved with allergic reactions (immunoglobulin E, IgE), presenting foreign molecules (antigens) and recruiting cells (phagocytes) to engulf foreign material. As well as being a cellular barrier to external agents, they have a regulatory function on nerves, blood circulation, fibrous tissue and other immune cells.

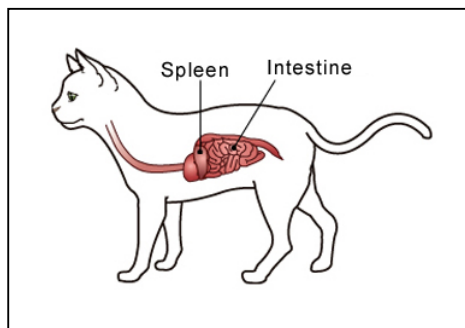
Not surprisingly, with all these functions, mast cells are not a single cell type and the cancers of these cells vary in type in different parts of the body.

What are these tumors?

These notes are provided to help you understand the diagnosis or possible diagnosis of cancer in your pet. For general information on cancer in pets ask for our handout "What is Cancer". Your veterinarian may suggest certain tests to help confirm or eliminate diagnosis, and to help assess treatment options and likely outcomes. Because individual situations and responses vary, and because cancers often behave unpredictably, science can only give us a guide. However, information and understanding for tumors in animals is improving all the time.

We understand that this can be a very worrying time. We apologize for the need to use some technical language. If you have any questions please do not hesitate to ask us.

These are tumors originating from the body's mast cells. The tumors are malignant cancers. There are two main types of internal (visceral) mast cell tumors, one originating in the blood forming (hemopoietic) organs, such as the spleen and bone marrow, and the other originating in the gut (usually the intestine but occasionally the stomach). Tumors of the lungs also occur but are rare.



What do we know about the causes?

The reason why a particular pet may develop this, or any cancer, is not straightforward. Cancer is often seemingly the culmination of a series of circumstances that come together for the unfortunate individual.

Research results suggest that abnormalities of certain receptors (key-lock mechanisms) on the surface of cells may contribute to some cases of human mast cell tumors. Other causes are overproduction of those chemicals that stimulate mast cell proliferation (such as Stem Cell Factor, SCF), cellular genetic mutations and gene malfunctions. Details of these are beyond the scope of these notes. There is variability in behavior of tumors because they are genetically varied.

Are they common tumors?

Mast cell tumors in the skin are common but visceral mast cell tumors are rare. Mast cell tumors of the spleen and other hemopoietic organs are associated with cancer cells in the blood (leukemia) and are more common in cats and people than in dogs.

Intestinal mast cell tumors are uncommon. They occur mainly in aged cats and, rarely, dogs. The main site is the lower small intestine. They are less common in the stomach and mouth.

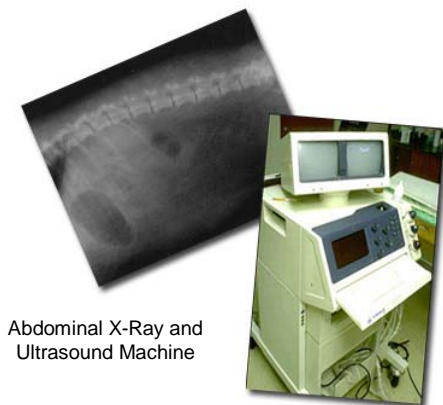
How will this cancer affect my pet?

Mast cell tumors of the spleen usually make the organ swell so the abdomen is swollen. If there is pressure on the stomach, there may be vomiting and loss of appetite. As the disease can affect many organs and the cancer cells are present in the blood, other organs such as the liver, kidney and bone marrow may be affected. Other signs therefore include lassitude, fever, weight loss, small bleeding points, anemia and diarrhea. Inflammatory substances produced by the tumors may induce effects elsewhere in the body such as gastritis.

Intestinal tumors do not circulate in the blood. They are nodules in the gut that obstruct the passage of food. They eventually spread elsewhere in the body. In contrast to mast cell tumors of the spleen and skin, these tumors do not produce many inflammatory mediators such as histamine so ulcers of the intestine are rare.

How is this cancer diagnosed?

Cancer is often suspected from clinical signs, particularly upon physical examination by your veterinarian. X-rays and ultrasound are often helpful to detect tumors. Blood samples may indicate anemia but this is not specific. Only some mast cell tumors have cancer cells in the blood and then only intermittently.



Abdominal X-Ray and
Ultrasound Machine

In order to identify the tumor definitively, it is necessary to obtain a sample of the tumor itself. This usually involves exploratory surgery to obtain tissue samples for microscopic examination. Cytology, the microscopic examination of cell samples, is not reliable for these internal tumors. Histopathology, the microscopic examination of specially prepared and stained tissue sections, is needed. This is done at a specialised laboratory where the slides are examined by a veterinary pathologist.

The histopathology report typically includes additional information which help to indicate how the cancer is likely to behave.

What types of treatment are available?

Surgical removal of the whole spleen or part of the gut affected is the treatment of choice for tumors in these organs. Surgery does not cure the disease although it slows the progress. Organs such as the liver and bone marrow cannot be removed.

In some countries, chemotherapy is used to try to induce remission and prolong life in mast cell cancers. The drugs used are toxic to organs with dividing cells such as the intestine, bone marrow and skin. Some also affect other organs such as the liver to induce malaise. Responses to both single-agent and multi-agent chemotherapy are poor. There is no good comparative data on the efficacy of the steroid drug prednisolone and combination chemotherapy regimens and the optimum chemotherapy protocol is unknown.

Vomiting and diarrhea due to release of chemical substances by mast cells can be treated symptomatically.

Can this cancer disappear without treatment?

Cancer rarely disappears without treatment but as development is a multi-step process, it may stop at some stages. The body's own immune system can kill cancer cells but it is rarely 100% effective. These cancers have ready access to the lymph and blood transport systems so they may be elsewhere before diagnosis. Poor blood supply and degeneration of tumors does not eliminate them.

How can I nurse my pet?

After surgery, the operation site needs to be kept clean and your pet should not be allowed to interfere with it. Any loss of sutures or significant swelling or bleeding should be reported to your veterinarian. You may be asked to check that your pet can pass urine and feces or to give treatment to aid this. If you require additional advice on post-surgical care, please ask.



How will I know how the cancer will behave?

Histopathology will give your veterinarian the diagnosis that helps to indicate how it is likely to behave. The veterinary pathologist usually adds a prognosis that describes the probability of recurrence and metastasis.

These tumors are unlikely to be cured permanently by surgery. Those in the spleen are part of a multiorgan (systemic) disease and are usually elsewhere such as in the liver, kidney and bone marrow as well as the blood.

Tumors of the intestine can be cured surgically for significant periods of time. However, they usually recur and spread to the local lymph nodes, followed by liver, spleen and, rarely, lungs.

Are there any risks to my family or other pets?

No, these are not infectious tumors and are not transmitted from pet to pet or from pet to people.