FELINE MAST CELL TUMORS
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INTRODUCTION
Mast cell tumors are uncommon in cats and relatively little information has been published about them compared to the plethora of information found in the literature regarding canine mast cell tumors. There are several important differences between canine and feline mast cell tumors. This session will focus on the unique aspects of mast cell tumors in cats, ending with a comparison between these tumors in feline and canine patients.

CUTANEOUS MAST CELL TUMORS (CMCT)
Cats with cutaneous mast cell tumors may presented with a solitary dermal mass, a few masses, or a large number (up to 100 or more) of lesions. The masses are usually pink and alopecic, and they may be smooth or ulcerated. Feline mast cell tumors of the mastocytic variety can often be diagnosed cytologically. The head and neck have been reported to be the most common anatomic locations for feline CMCT.1,2,3 Recommended staging tests are similar to those for canine mast cell tumors and involve complete blood count, chemistry panel, cytological evaluation of the regional lymph node, and possibly abdominal ultrasound.

Surgical excision is the treatment of choice for cats with solitary or few cutaneous mast cell tumors. If regional lymph node metastasis is present, then it would be recommended to remove the metastatic lymph node when the primary tumor is removed. The completeness of surgical excision is not a prognostic factor for recurrence, so a marginal excision is considered sufficient.4 If surgical removal is not an option due to tumor size and location, then radiation therapy can be used. Response rates for feline cutaneous mast cell tumors to radiation therapy have not been reported, and either definitive or palliative courses can be used depending on the particular cat’s clinical condition and expected prognosis. If localized therapy is not appropriate given the extent of cutaneous lesions or metastatic disease, then systemic therapy can be considered.

Cytotoxic options for feline cutaneous mast cell tumors that have been reported include lomustine and imatinib mesylate (GleevecTM).5,6,7 No studies evaluating the efficacy of vinblastine for feline mast cell tumors have been published. Treatment of 11 cats with mast cell tumors with imatinib has been reported, and 8 of them had some degree of tumor regression.5,6 A multi-center retrospective study of the use of lomustine to treat feline mast cell tumors found a response rate of 50% in cats with primary cutaneous tumors.7 Supportive care for these patients includes glucocorticoids to reduce inflammation and possible cytotoxic effects, H1 and H2 blockers, and antibiotic and analgesic treatment as needed.

The prognosis for cats with solitary cutaneous mast cell tumors is excellent following surgical removal; however, these cats are likely to develop additional mast cell tumors in the future. The effect of lymph node metastasis on prognosis is unknown. In the author’s experience, some cats with numerous cutaneous mast cell tumors can live for several months or more with stable or slowly progressive disease and a good quality of life. Histopathological evaluation of feline CMCT is different than the evaluation scheme used for dogs. Two studies have shown that applying the Patnaik mast cell tumor grading system does not predict outcome in feline CMCT.2,3 This finding is likely due to the benign biological behavior of most feline CMCT. Instead of tumors being categorized by grade, they are classified according to the predominant cell type then subclassified based on the appearance and criteria of malignancy demonstrated by those cells. Specifically, tumors are categorized as mastocytic or atypical/poorly granulated.8 The latter category has previously been named histiocytic, but that name is discouraged to avoid confusion with true histiocytic diseases and tumors. The mastocytic tumors are then categorized as well differentiated or pleomorphic. Well differentiated mastocytic CMCT are expected to carry a good prognosis with
treatment. Pleomorphic CMCT may have a more aggressive clinical course compared to well differentiated CMCT, but the available data to support or contradict this statement are lacking.\textsuperscript{3,9}

Mitotic index has recently been shown to be associated with survival in cutaneous mast cell tumors.\textsuperscript{10,11} The median mitotic index for cats dying of mast cell disease within 2 years of diagnosis was significantly higher compared to the median mitotic index of cats alive for more than 2 years after the diagnosis (3.5 versus 1.0, \( p < 0.002 \)).\textsuperscript{10} Mitotic index > 5 is associated with shorter survival after surgery in cats with cutaneous mast cell tumors.\textsuperscript{11}

**VISCERAL MAST CELL TUMORS**

Cats with visceral mast cell disease are expected to exhibit clinical signs such as vomiting, diarrhea, constipation, or lethargy, depending on the anatomic location involved (GI tract, spleen, liver, etc.). They may also exhibit signs of mast cell degranulation. An abdominal mass and/or splenomegaly may be noted on abdominal palpation. Systemic mast cell disease may be suspected if mast cells are noted on a blood smear, though the quantity of mast cells seen does not necessarily correlate with extent of systemic disease.\textsuperscript{12,13} Cytology is often sufficient for the diagnosis. Staging tests such as buffy coat evaluation and/or bone marrow aspirate may be recommended. Chest radiographs can be performed to assess the sternal lymph node.

Similar to cutaneous tumors, surgical excision is the treatment of choice for cats with splenic mast cell tumors. Mast cell disease was the most common reason (53\%) for splenectomy in a small study evaluating the outcome of splenectomy in 19 cats.\textsuperscript{14} The long-term prognosis of cats with splenic mast cell disease post splenectomy is relatively good.\textsuperscript{15} The role of adjuvant chemotherapy for these patients is unclear and in the author’s opinion it is not recommend given the lack of evidence for any efficacy and the expected prognosis with surgery alone. If surgery is not performed, chemotherapy and any necessary supportive care can be administered, though the effect on outcome is unknown.

Cats with intestinal mast cell tumors will exhibit clinical signs related to the mass. They may also have intermittent clinical signs indicating degranulation episodes. Cats with intestinal mast cell tumors may have gastrointestinal ulcers as well. Even with surgical removal the prognosis has historically been considered grave.\textsuperscript{4} One variant of intestinal mast cell tumors in cats, called feline intestinal sclerosing mast cell tumor, has been recently described. Clinical follow-up was obtained regarding 25 of the 50 cats from whom samples were evaluated, and the prognosis was poor, with most cats living just 2 months after surgical resection.\textsuperscript{16} In contrast, a more recent study of 15 cats with intestinal mast cell tumors found that 7 of the 13 cats available for follow up survived more than 1 year after diagnosis.\textsuperscript{17} The cats received a variety of treatments, and four out of nine cats that underwent intestinal mass resection lived less than 1 month after surgery due to surgical complications.\textsuperscript{17}

**CONCLUSION**

Feline mast cell tumors remain a distinct entity from canine mast cell tumors in their clinical presentation and behavior. Visceral mast cell tumor carries a different prognosis in cats compared to dogs, making definitive treatment, such as surgery, an option for some feline patients. Further research is needed to clarify the biological behavior and prognostic factors associated with feline intestinal mast cell tumors and to better define the role of molecular therapies, such as receptor tyrosine kinase inhibitors, in the management of feline mast cell tumors.

**REFERENCES**

6. Isotani M, Yamada O, Lachowicz JL, et al. Mutations in the fifth immunoglobulin-like domain of kit are