General Information
Mast cell tumors (MCTs) are the most common tumor in dogs and the second most common tumor in cats.¹⁻⁵ MCTs are primarily a disease of older dogs and cats; however, extremely young dogs and cats have been reported to have MCTs. Canine breeds reported to be at increased risk for MCTs are boxers, Boston terriers, Labrador retrievers, terriers, and beagles. The only feline breed that has been reported to be at increased risk for MCTs are Siamese. Most reports show no significant gender predilection for MCTs in dogs or cats. The etiology of MCTs is presently unknown. Many have suspected a viral etiology due to MCT transplantability to susceptible laboratory dogs (extremely young or immunocompromised) with tumor cells and cell-free extracts. Recent evidence shows that a significant percentage of dogs with higher-grade MCTs have genetic mutations in c-kit (stem cell factor receptor) which may be responsible for the genesis and/or progression of MCTs in dogs. Not all dogs with MCTs have c-kit mutations, suggesting that they are not the only mechanisms for the development and/or progression of MCTs.

Some 85 to 90 percent of dogs and cats with MCTs have solitary lesions. It is important to note that not all dogs or cats with multiple MCTs have metastatic or systemic mastocytosis. Studies suggest that well-differentiated MCTs are slow-growing, usually < 3–4 cm in diameter, without ulceration of overlying skin; are variably alopecic; and commonly are present for more than 6 months. In contrast, poorly differentiated MCTs are rapidly growing; are variably sized (but generally large), with ulceration of the underlying skin and inflammation/edema of surrounding tissues; and rarely are present for more than 2–3 months before presentation. Since most MCTs are of moderate differentiation, signs may be somewhere between these extremes.

Prognosis and Prognostic Factors
Histopathologic examination and grading of MCTs has been found to be one of the most important prognostic indicators by multiple groups. The Patnaik grading scheme (well-differentiated = grade I, moderately-differentiated = grade II, and poorly differentiated = grade III) has shown that 83%, 44%, and 6% of dogs with grades I, II, and III tumors respectively were alive approximately 4 years after surgery.⁶ This grading scheme has not been found to be of use for cats with MCT.⁷ Unfortunately, there is significant grade heterogeneity across pathologists when given the same canine MCT,⁸ suggesting that additional, less subjective measures are necessary to more completely delineate the prognosis for a dog with MCT.

Additional negative prognostic factors include advanced stage, caudal half of body location, high growth rates, aneuploidy, presence of systemic signs, and many others.²⁻⁴,⁷⁻¹⁰ Newly discovered histological and/or molecularly-based negative prognostic factors include increased AgNOR (silver nucleolar organizing regions) scores, increased PCNA/Ki67 immunohistochemistry (IHC) expression (proliferation markers), increased vascularity and/or mitotic index, and increased c-kit IHC expression.¹¹⁻²¹ The use of panels of the aforementioned prognostic factors is strongly recommended due to their significant predictive ability for both the subsequent development of metastasis as well as subsequent development of recurrence and examples of their use will be given in the session.

References


