

Soft Tissue Sarcoma

What are soft tissue sarcomas?

Soft tissue sarcomas are tumors derived from connective tissue (nerves, cartilage, fibrous tissue, muscle) of the skin as well as subcutaneous tissues and are considered collectively due to their similar clinical behavior. Although they appear as discrete, well encapsulated masses, they are characterized by a high risk of local tissue invasion that makes complete surgical excision unlikely without wide, deep margins. Soft tissue sarcomas can occur anywhere on the body and depending on their grade, may either have a slow or fast growth rate. There is no breed or sex predilection. The cause of these tumors is unknown but may be associated with trauma, foreign bodies and parasites.

What are the clinical signs?

These tumors are often associated with no clinical signs. Usually the owner will report finding a solid mass on their pet's body. When present, clinical signs are often associated with the site of involvement and tumor invasiveness. As they get large, they may start to ulcerate or your pet may begin to lick the tumor.

How is Soft Tissue Sarcoma diagnosed?

Fine needle aspiration (FNA) and cytology is often important in excluding other tumor types. In some cases, FNAs may provide the clinician with this basic tumor type, "spindle cell tumor". However, the definitive diagnosis is made with biopsy and histopathology. Furthermore, histopathology provides a tumor grade, which is important to plan potential further treatment. Further staging will depend on the type of soft tissue sarcoma, but usually will involve basic blood work (CBC/Chemistry Profile), urinalysis, three view thoracic radiographs and regional imaging of the tumor for surgical planning (CT vs MRI). An abdominal ultrasound may be indicated depending on your pet's clinical signs and physical examination, or the location of the tumor. FNA or biopsy of regional lymph nodes may be indicated if there is a suspicion of local tumor spread.

What are the treatment options?

- **Surgery:** Treatment often depends on the sarcoma type and the grade. However, the principal goal is local, primary tumor control and often surgery is the initial treatment of choice. Because these tumors are highly invasive, complete surgical excision depends on the tumor's location and size. Unfortunately, complete surgical removal is not always possible. With incomplete surgical excision for most sarcomas, the risk of local disease recurrence, if no additional therapy is pursued, is >70%, with the most likely time of recurrence happening within 6 months of surgery. The first surgery is of the utmost importance and should include wide, deep margins.
- **Radiation Therapy:** This therapy is often used in the management of residual microscopic local disease after surgery, or if aggressive surgery is not a viable option. In the event that microscopic disease is left behind at the surgical margins, the goal with definitive radiation is to prevent or delay the recurrence of the tumor.

- Definitive radiation would involve daily treatments for a total of 15-18 treatments and is associated with a >70-95% chance of patients being disease-free at the primary tumor site at 1 year when used as adjuvant therapy for incomplete surgical margins. Side effects of radiation therapy include a superficial dermatitis, like sunburn, that would occur on the skin exposed to the radiation field. Side effects are typically encountered later in the treatment and are effectively addressed with supportive topical and/or systemic medications.
- **Chemotherapy:** Of additional concern with Soft Tissue Sarcomas is the chance of disease spread regionally to lymph nodes and distantly to the lungs. The risk for distance metastases, most commonly to the lung, ranges from 11-40% depending on the histological grade and size of the tumor. Additionally, distant metastasis often occurs late in these tumor types with a median time of 365 days. Based on histopathology or biopsy, adjuvant therapy may be recommended with chemotherapy. Doxorubicin based treatment protocols are most often used. It may be combined with other chemotherapeutics as well. We believe that chemotherapy is associated with a longer disease free interval but may not be associated with a longer overall survival. Examination of the treatment site is recommended at regular, frequent intervals to monitor for early recurrence.

What is the prognosis?

Prognosis for soft tissue sarcomas is most dependent on surgical resectability and grade. Patients with low or even intermediate grade tumors that can be completely excised surgically will typically have an excellent long term prognosis.

The completeness of the surgery or the resectability of the tumor is most predictive of survival. Radiation therapy following microscopically incomplete surgery is very effective at local tumor control. The current literature reports control rates for patients that receive adjuvant radiation therapy following an incomplete tumor resection of approximately 80% at 1 year and 60% at 2 years. Approximately 50% of dogs will have their tumors controlled for 4 years. Unfortunately, tumor recurrence occurs within 1 year post surgery in the majority of dogs with incompletely excised soft tissue sarcomas that did not receive adjuvant treatment.

Tumor grade is also highly predictive of soft tissue sarcoma prognosis. Patients with low grade tumors are unlikely to develop metastasis (<10% of patients). In comparison, patients with a high grade soft tissue sarcoma have a 25-40% chance of developing metastasis. Chemotherapy may be beneficial in delaying the onset of metastases. Chemotherapy is best used in the setting of microscopic disease and therefore is best used before metastases develops (typically best immediately after the first surgery). When recurrence does occur, these new tumors often have a more aggressive biologic behavior, with an increased chance of metastasis and an increased difficulty of controlling locally.