

Feline Injection Site Sarcoma

WHAT IS AN INJECTION SITE SARCOMA?

Feline injection-site sarcoma arises from connective tissues. The most common injection site sarcoma in cats is a fibrosarcoma. Regardless of underlying tissue type, all injection site sarcomas behave as locally aggressive tumors with a modest chance of spread to distant sites in the body.

Injection site sarcomas arise at sites where the cat previously received an injection. Tumors are caused by vaccines (feline leukemia virus and rabies vaccines), microchips, injections of long-acting antibiotics, long-acting glucocorticoids, lufenuron, and reaction to nonabsorbable suture. Cats may be genetically predisposed to developing injection site sarcomas, though the exact nature of this relationship is unclear.

Despite the association with vaccination, the risk of not vaccinating for certain diseases may be much higher than the risk of tumor development. Vaccine protocols and injection methods continue to be evaluated. Cat owners should talk with their family veterinarian about which vaccines, including boosters, are recommended. Cats with a history of injection-site tumors should not receive future vaccinations.

WHAT ARE THE CLINICAL SIGNS?

Owners typically note a lump while petting their cat, or the tumor may be found incidentally on physical examination. Tumors can occur as early as 4 weeks, and as late as 10 years, post vaccination. Guidelines for when to have a mass evaluated are: Persistence for greater than three months, if the mass is larger than two centimeters, or if the mass increases in size over one month. If metastasis (spread) is present, signs of systemic illness including lethargy, decreased appetite, vomiting, and increased respiratory rate and/or effort may be noted.

WHAT DIAGNOSTICS ARE PERFORMED?

The typical initial diagnostic step involves fine needle aspirate cytology, where a small needle is inserted into the mass to obtain a sample of cells for cytologic evaluation. Differentiating a sarcoma from a vaccine reaction or other collection of inflammatory cells is difficult and this form of sampling may be unsuccessful in achieving a definitive diagnosis. Surgical biopsy can be done in such cases. An incisional biopsy involves removing a small piece of tissue from the mass whereas excisional biopsy entails an attempt at removing the entire mass. Given the locally invasive nature of these tumors, advanced imaging such as contrast-enhanced CT or MRI is typically necessary to determine the extent of disease prior to attempt at excisional biopsy. Additional diagnostics include blood tests to assess overall health and chest x-rays for evaluation of disease spread. Regional lymph nodes should be palpated carefully and assessed cytologically if possible.

TREATMENT OPTIONS AVAILABLE AND PROGNOSIS:

Surgery

Injection site sarcomas infiltrate extensively through surrounding tissues. Wide surgical resection is recommended given the high rate of local tumor recurrence with incomplete resection. Recurrence can occur even when complete surgical margins are obtained and may occur soon, or up to several years, after removal. Active surveillance of the surgery site is recommended to monitor for recurrence.

Radiation Therapy

Radiation therapy can be done prior to, or after, surgical removal of the tumor. Radiation therapy consists of daily treatments for several weeks. Radiation therapy is well tolerated by animals though brief anesthesia is required. Radiation therapy combined with surgery has been shown to significantly improve survival over surgery alone.

Chemotherapy

Chemotherapy is recommended as part of a treatment plan for most injection site sarcomas. Spread to distant sites in the body occurs in up to 25% of cats. This risk increases when the tumor regrows after repeated surgeries. Several chemotherapeutic regimens have been shown to have activity against injection-site sarcomas. Alternative options include immunotherapy with an IL-2 vaccine and electrochemotherapy.

The prognosis for cats with injection-site sarcomas depends on several variables and treatment protocols are tailored for the patient and also towards your goals as an owner. In general these are difficult tumors to treat and cure is rare. The rate of tumor control and prognosis correlates the aggressiveness of the surgery done to remove the tumor, with the most aggressive surgery affording a median survival time of 2.5 years. When tumors are located along the limb, amputation can be the best option for long term tumor control. Cats with tumors that have grown back after repeated surgeries have a poorer prognosis. The best time to treat with chemotherapy and radiation therapy at the time of initial diagnosis, rather than after regrowth is noted.

WHAT ARE THE SIDE EFFECTS?

Side effects depend on treatment selected and the extent of disease and clinical signs. Surgery carries risk of anesthesia, though this is minimal. Other risks include bleeding and complications from healing or infection. Side effects of chemotherapy are infrequent and most commonly include temporary gastrointestinal upset such as vomiting or diarrhea. Decreased appetite and lethargy may also occur. Radiation therapy includes the use of anesthesia during treatments and side effects include gastrointestinal upset (vomiting, diarrhea), local skin irritation, and potential interference with surgical healing. Your pet will be prescribed supportive medications for nausea (manifested by decreased appetite, or increased salivation, or drooling) and diarrhea for you to have on hand at home to use if necessary. It is best to be proactive with these medications and provide these as soon as signs are noted. Should you have any questions, your oncology team is available to assist.

CONCERNS OF CHEMOTHERAPY FOR MY PET:

Chemotherapy often carries a negative impression, especially with our understanding of chemotherapy in human medicine. Our approach to chemotherapy in veterinary medicine is focused on limiting severe side effects and providing increased quality of life. Chemotherapy in human medicine is provided with intent to cure by using very high doses and increased side effects. As quality of life is imperative for our pets, doses are adjusted, and your pet is monitored to limit severe side effects. Hair loss is rare but cats tend to lose their whiskers. Though there is a slight risk of hospitalization in our pet population and mild gastrointestinal upset, the majority of pets tolerate therapy well. Should you have concerns during therapy, speak with your oncologist in order to develop a tailored plan for your pet.

HOW DO I PREPARE?

We understand this is a difficult time and we are here to support you and your pet by providing the options and care necessary. Selecting a therapy is not binding and can be adjusted to you and your pet's needs. During treatment sessions, you will be provided with updates and any recommendations depending on your pet's response. Should any concerns arise, your oncology team will provide answers and help to guide you.

NAVIGATING THROUGH MY OPTIONS:

Treatment	Prognosis- (median)/ Duration of tumor control	Treatment schedule
Surgery	Varies with aggressiveness of procedure: 3 months to 2.5 years	CT scan followed by surgery
Radiation Therapy: pre- or post-operative For non-surgical tumors: <ul style="list-style-type: none"> • Stereotactic • Palliative 	18-24 months 10 months 3 months	Varies between 14-20 daily treatments. CT scan required. 3-5 consecutive treatments. CT scan required. (Stereotactic) 4-6 daily or weekly treatments. CT scan likely required. (Palliative)
Surgery and Chemotherapy	May be better than surgery alone	Injectable chemotherapy: every 2-3 weeks starting 10-14 days post-operatively Metronomic chemotherapy: daily or every other day, at home
Surgery and Radiation Therapy (pre- or post-operative)	18-32 months pending completeness of excision	
Surgery, Radiation Therapy, and Chemotherapy	Up to 2 years or more	CT scan, surgery, in some cases post-operative CT, radiation therapy (10-14 days postoperative), chemotherapy
Chemotherapy alone	Control 4 months, Survival 8 months if respond	Injectable chemotherapy every 2-3 weeks
Feline IL 2 Immunotherapy vaccine	When combined with surgery and radiation, > 24 months	Series of 6 injections - schedule varies if done pre-surgery vs. post-surgery. Tumor should be 5 cm or less in size for optimal outcome
Electrochemotherapy	6 months	1-3 treatments every other week post-operatively

GETTING STARTED

Once you have determined the best therapeutic option for your pet, you will work with our oncology team to develop an appointment plan.

Scheduling: Patients undergoing treatments must have a scheduled appointment prior to arrival.

- > Schedule your appointments at reception upon check out
- > Drop offs are requested between 7:30-8:30am
- > No discharges are done between 3:30pm- 4:30pm as our oncology team is in rounds