



INJECTION-SITE SARCOMAS IN CATS

What is an injection-site sarcoma?

An injection-site sarcoma is a tumor of the connective tissues in the cat. The most common cell type affected is the fibroblast, giving the tumor the name fibrosarcoma. Other tumor types have been described (osteosarcoma, chondrosarcoma, malignant fibrous histiocytoma). The tumor types behave similarly and are therefore treated the same way. The tumors are often located between the shoulder blades, in the hip region, and in the back legs.

A cause and effect relationship has been established for certain vaccines, including rabies and feline leukemia. However, other chronic injections such as lufenuron (Program) also have been thought to cause these tumors. It is likely there is a genetic predisposition to the development of these tumors in certain cats; however, the exact genetic problem has not yet been identified.

How is it diagnosed?

Needle aspirates are useful in increasing your veterinarian's suspicion of cancer. However, sometimes it is difficult to differentiate an injection-site sarcoma from a vaccine reaction or granuloma on aspirates. Sometimes these tumors do not exfoliate or "give up" their cells easily, making a diagnosis by needle aspirate difficult. A surgical biopsy is often necessary to make a definitive diagnosis of injection-site sarcoma.

Once an injection-site sarcoma has been diagnosed, other diagnostic tests are indicated prior to considering treatment. Chest x-rays are necessary to determine whether there is any evidence of metastasis (spread) to the lungs. Additionally, routine bloodwork should be performed to assess the overall health of your cat. In most cases, a CT scan may be recommended to determine the extent of your cat's tumor and to appropriately plan surgery and/or radiation treatments.

How is it treated?

Surgery

Surgery is the mainstay of treatment for injection-site sarcoma. Surgical removal needs to be wide and deep, as these tumors grow by sending "finger-like" projections of



tumor cells among the tissues. The edges of the biopsy are evaluated to determine whether the margins are “clean” (no evidence of tumor cells at surgery margins) or “dirty” (tumor cells extend to surgery edge). Cats with “clean” surgery margins often do better, but tumors have been noted to regrow, even with “clean” margins. In most instances, surgery alone is not curative and other treatments, such as radiation and chemotherapy are recommended as an adjunct to surgery.

Radiation Therapy

Radiation therapy may be performed either before or after surgical removal of the tumor in order to treat any residual tumor cells that may remain after surgery. Radiation therapy is performed on a daily basis, Monday through Friday, for 4 weeks. A brief anesthetic episode is necessary so that your cat remains still for treatment. Radiation therapy is well tolerated by animals. Radiation therapy combined with surgery has been shown to significantly improve survival over surgery alone. Please refer to the Radiation Therapy handout for more detailed information.

Chemotherapy

Chemotherapy may be recommended for recurrent tumors or tumors that may behave aggressively based on biopsy characteristics. Two chemotherapy drugs, doxorubicin and carboplatin, have shown activity against injection-site sarcomas. These drugs are often combined. Both drugs are given intravenously every 3 weeks for 5-6 treatments. Chemotherapy is extremely well-tolerated in cats. Please refer to the chemotherapy handouts for additional information. Doxorubicin in combination with surgery may be better than surgery alone.

What is the prognosis?

Injection-site sarcomas in cats are very difficult to treat. Cats with tumors on the legs, where an amputation can be performed, appear to do better than cats with tumor on the trunk of the body. Treatment combining surgery, chemotherapy and radiation therapy significantly increases the tumor free time to 18-24 months. Cats with tumors that have grown back after repeated surgeries before additional treatments are tried are more difficult to control. Thus, the best time to treat with chemotherapy and radiation therapy is the very first time the tumor occurs. Metastasis (spread) to other parts of the body is reported between 10-25%. This potential increases when the tumor regrows after repeated surgery.



Can injection-site sarcomas be prevented?

There is a test being marketed that purports to determine whether an individual cat is predisposed to the development of an injection-site sarcoma. However, this test has not been widely evaluated and the risk of not vaccinating for certain diseases may be much higher than the risk of tumor development. The best advice is to vaccinate discriminately and make educated decisions about which diseases your cat should be vaccinated for. Please discuss your concerns about vaccination with your cat's regular veterinarian. Vaccination on the lower limbs and tail has been advocated, such that amputation of the affected leg or tail can be performed if a tumor should occur. Cats that have been treated for an injection-site sarcoma should not receive any future vaccinations.