



THE SARCOMA THAT WASN'T

Contributing Author
Gary Norsworthy
DVM, DABVP (Feline)
Alamo Feline Health Center
San Antonio, TX

Stripes, a 12 year old Mn DSH, was presented on July 12, 2011 for an annual examination and needed vaccines. Our annual exam begins with the client filling out a history form that begins with risk assessment, asks about diet and medications, and progresses to questions regarding specific clinical signs, and ends asking the client for a summary of their concerns. Stripes' owner stated that Stripes goes indoors and outdoors freely, but she did not list any clinical signs. She also noted that Stripes was receiving a topical flea control/heartworm prevention product monthly but is not taking any other medications.

I perform a "bumper-to-bumper" physical examination beginning at the nose. It and the other structures of the head and neck were not remarkable. Auscultation of the heart and lungs was also not remarkable. The abdomen was palpated carefully; each palpable organ was of appropriate size and location. The legs and tail were examined including an inspection of the perineal area for signs of tapeworms. At the conclusion of the examination, I told the owner that Stripes' examination was great.

Because of Stripes' age, I recommended a senior blood screen consisting of a CBC, chemistry panel, and total T4. Three-fourths milliliter of blood was collected from the medial saphenous vein. This permitted performance of these tests on my Abaxis hematology (VetScan HM5) and chemistry (VetScan VS2) machines.

As the blood tests were being performed, I re-emphasized the need for flea control and heartworm prevention on a year-round basis. I was pleased when Stripes' owner purchased another year's supply. Next, I administered vaccines. An adjuvanted killed FVRCP¹ was given subcutaneously below the left stifle. A non-adjuvanted rabies vaccine² was given subcutaneously below the right stifle. Finally, a combination adjuvanted killed vaccine for the feline leukemia virus and the feline immunodeficiency virus³ was given subcutaneously near the left elbow. My protocol is to give FVRCP and rabies vaccines to all patients and FeLV-FIV vaccine to cats that go outdoors unsupervised.

By this time the blood panel was completed. I was pleased to announce that Stripes' tests were all normal. This included blood counts and tests for liver disease, kidney function, glucose, electrolytes, and total T4. Stripes' owner was commended for being a responsible pet parent. I will see Stripes again in six months for another wellness exam and senior blood panel.

Stripes' annual physical examination and vaccine administration is significant because Stripes was the last cat in a retrospective study of injection site sarcomas (ISS) that have occurred in cats vaccinated in my practice. I am writing this report twelve months since Stripes was vaccinated.

Injection site sarcomas were originally called vaccine-associated sarcomas; however, the occurrence of these very aggressive tumors has also been associated with other injectable products (antibiotics, steroids, lufenuron, and, most recently, meloxicam), intra-abdominal gauze, and microchips. Therefore, the name was appropriately changed to ISS. Sometimes they are referred to as "induced sarcomas" in contrast to "spontaneous sarcomas."

The cause of ISS has been debated for over a decade. Initially, chronic inflammation was seen as the culprit, and the adjuvants in rabies and leukemia vaccines were seen as the most common cause of this inflammation. This was one of the primary factors that caused many to change vaccine intervals and spurred the development of "non-adjuvanted"

vaccines with claims that without an adjuvant the vaccine was no longer a cancer threat. However, the occurrence of ISS associated with long-acting steroids and meloxicam makes this theory problematic as both of these products are inherently anti-inflammatory.

I have a large feline-only practice that opened in 2000. Due to my feline volume, I expected to see many of these life-threatening tumors. Since the incidence is most commonly estimated to be one sarcoma in each 10,000 doses of vaccine, logically I should be seeing one or more every year or two. However, my memory could not make those numbers correlate. Therefore, I decided to do a search of my paperless records for cases of ISS and to review my vaccine purchases over the past 10+ years. Here is what I found:

Although I had seen several of ISS in referral patients, I could only find one cat vaccinated in my practice that developed one from March 6, 2000 through July 12, 2011. His name was Bo, and his ISS occurred in his right rear leg. The tumor appeared as a small lump about four months post-vaccination. The details of my vaccine usage are as follows:

Doses of Non-adjuvanted Vaccines Administered

Rabies 20,739
FVRCP 10,376
Herpes-Calici 1,464
Total 32,579 (53%)

Doses of Adjuvanted Vaccines Administered

FVRCP 13,905
FeLV 6,588
FIV 4,410
FeLV/FIV 1,731
VS-Calici 2,139
Total 28,773 (47%)

Total Adjuvanted + Non-Adjuvanted = 61,352



VetScan
 Comprehensive Diagnostic Profile



VetScan
 Thyroxine (T4)/Cholesterol Test



Figure 1: Sarcoma occurred at the site of a non-adjuvanted rabies vaccine.

I expected the one ISS from the cats vaccinated in my practice to be at the site of an adjuvanted vaccine. However, that was not the case. It occurred at the site of a non-adjuvanted rabies vaccine! [See Figure 1].

These data have an N that is great enough to have statistical power. More importantly, they seriously challenge the stated incidence of 1:10,000 and the notion that adjuvanted vaccines are more likely to be associated with ISS than non-adjuvanted vaccines.

These conclusions are in agreement with several papers that link ISS to a rare genetic disorder that permits ISS to occur. The Vaccine-Associated Sarcoma Task Force stated: “But, it is a big leap of faith to say that it is solely the inflammatory reaction that induces a sarcoma. That leap has not been filled in with any kind of concrete structure. It takes the right kind of triggering event in the right individual cat to lead to neoplastic transformation.”

The “right individual cat” is the one with a genetic predisposition to the development of ISS.

Some would say that Stripes is one of the lucky cats that received two doses of adjuvanted vaccine but did not get an ISS. However, the reality is that Bo was one of the “unlucky” ones that had the wrong genetic makeup resulting in development of an induced sarcoma at the site of a non-adjuvanted rabies vaccine.

1. Felovax PCT + CaliciVax, Boehringer-Ingelheim
2. PureVax Rabies, Merial
3. Felovax LV-K\FIV, Boehringer-Ingelheim

