

## **Feline vaccine associated sarcoma: staging and treatment**

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References: Withrow & MacEwan (2013) Small Animal Clinical Oncology 5<sup>th</sup> Edition. St. Louis, Missouri: Elsevier Saunders.

### **History**

Stella, an 8 year old female spayed domestic shorthair cat, presented to the Oncology service at Canada West Veterinary Specialists on February 14<sup>th</sup>, 2019 for evaluation of a firm subcutaneous mass on the left lateral thoracic wall that had been present since late December 2018. The referring veterinarian had performed an incisional biopsy showing normal skeletal muscle and a small number of atypical spindle cells. Due to the history of Stella previously receiving a vaccine in this area there was concern for a vaccine associated sarcoma.

On physical exam a 4.5 x 5cm firm mass was noted over the caudal edge of the left thoracic wall. The physical exam was otherwise unremarkable. A CBC, chemistry profile, and urinalysis were performed. Stella had a mild anemia (HCT 0.30, RR 0.33-0.52) and marginally concentrated urine (USG 1.028). All other parameters were within the reference range.

Feline vaccine associated sarcomas are locally invasive tumors with aggressive clinical behavior. The primary treatment modality is surgery with wide margins of normal tissue (at least 2 – 3cm laterally and one fascial layer for the deep margin). Advanced imaging such as a CT scan or MRI is recommended prior to surgical excision as sarcomas often have multifocal projections into deeper tissues and can be extremely difficult to excise especially in cases where the tumor is on the body wall or between the shoulders. Survival time is improved in cats that receive surgery at a referral hospital and where wide margins are obtained at the time of the first surgery. Due to the high rate of local tumor recurrence radiation therapy is recommended either prior to or following surgical excision of the mass. Post-operative chemotherapy can also play a role in disease management and increasing the median disease free interval.

### **Work up and Treatment**

After consultation with the oncologist the owners elected to proceed with a CT scan to determine the extent of the mass and to determine Stella's treatment options. An ultrasound guided needle core biopsy of the mass was also performed. The CT scan showed a strongly contrast enhancing mass causing bony lysis of the left 11<sup>th</sup> rib. The mass reached both the left lateral aspect of the liver and the left caudal lung lobe without invasion of either the peritoneal cavity or the pulmonary parenchyma. There was no evidence of pulmonary metastatic disease. Two 16 gauge needle core biopsies were sent to the pathologist in an attempt to differentiate between chondrosarcoma, osteosarcoma, or injection site sarcoma. The pathologist read the sample as a soft tissue sarcoma, mitotic index 18, with no distinguishing features to further determine tumor type.

Due to financial and travel reasons, Stella's owners declined pre or post-operative radiation therapy. After consultation with the surgeon to discuss the risks associated with surgery they elected for radical surgical

resection of the mass followed by post-operative chemotherapy. Surgery was performed on March 5<sup>th</sup> 2019. 2cm gross margins were obtained laterally. A lateral thoracotomy was performed with removal of ribs 9 – 13 and the lateral portion of the diaphragm. The abdominal and thoracic wall were reconstructed with prolene mesh which was then secured to the surrounding musculature and remaining diaphragm. During surgery one small nodule (<1cm) was noted within the center of the left crus of the diaphragm. This mass was not visible on the pre-operative CT scan and was determined to be non-resectable due to its location. This mass was biopsied intra-op. A thoracostomy tube was placed before closure. Stella was hospitalized for three days post-operatively to ensure adequate analgesia/medical management and a gradual transition to oral medications before discharging to homecare.

The pathology report showed both the primary mass and the nodule on the diaphragm to be a high grade spindle cell sarcoma (mitotic index 18) with incomplete margins. The pathologist favoured a fibrosarcoma, possibly related to previous vaccination.

Stella returned on April 3<sup>rd</sup> 2019 to begin treatment with injectable chemotherapy (doxorubicin). Baseline three view thoracic radiographs were obtained and were within normal limits with the exception of a small abnormal area over the diaphragm, suspected to be pleural thickening. Doxorubicin was calculated at 1mg/kg IV (5.28mg). A 22 gauge IVC was placed into the left medial saphenous vein and flushed thoroughly to test patency. The calculated dose of doxorubicin was then drawn up using a CSTD and administered IV over the course of 20 minutes. Stella was given 75ml LRS subcutaneously to support hydration. Stella did not experience significant side effects or neutropenia following her first chemotherapy administration.

A total of five doses of doxorubicin were administered once every three weeks. Three view thoracic radiographs were repeated before the fourth dose to ensure there was no evidence of disease recurrence despite treatment. There was no evidence of disease recurrence based on the radiographs and the small abnormal area over her diaphragm was improved. It was elected to continue with the final two doses of doxorubicin. Her last dose of chemotherapy was administered on June 28<sup>th</sup>, 2019. Recheck thoracic radiographs were recommended eight weeks after her final dose of chemotherapy. At the time of this writing she has not yet had her first post chemotherapy recheck but the owners report that she is doing well at home.

## **Conclusion**

This case demonstrates both the importance and limitations of pre-operative imaging for determination of surgical planning as the CT was unable to visualize the small nodule found in the diaphragm during surgery. It also demonstrates the aggressive nature of these tumors. Even with surgery pursued only two months after the mass was first noted adequate margins could not be obtained. We hope Stella's injectable chemotherapy will help to prevent rapid recurrence at the surgical site and provide her with a disease free interval that justifies the aggressive surgical approach.