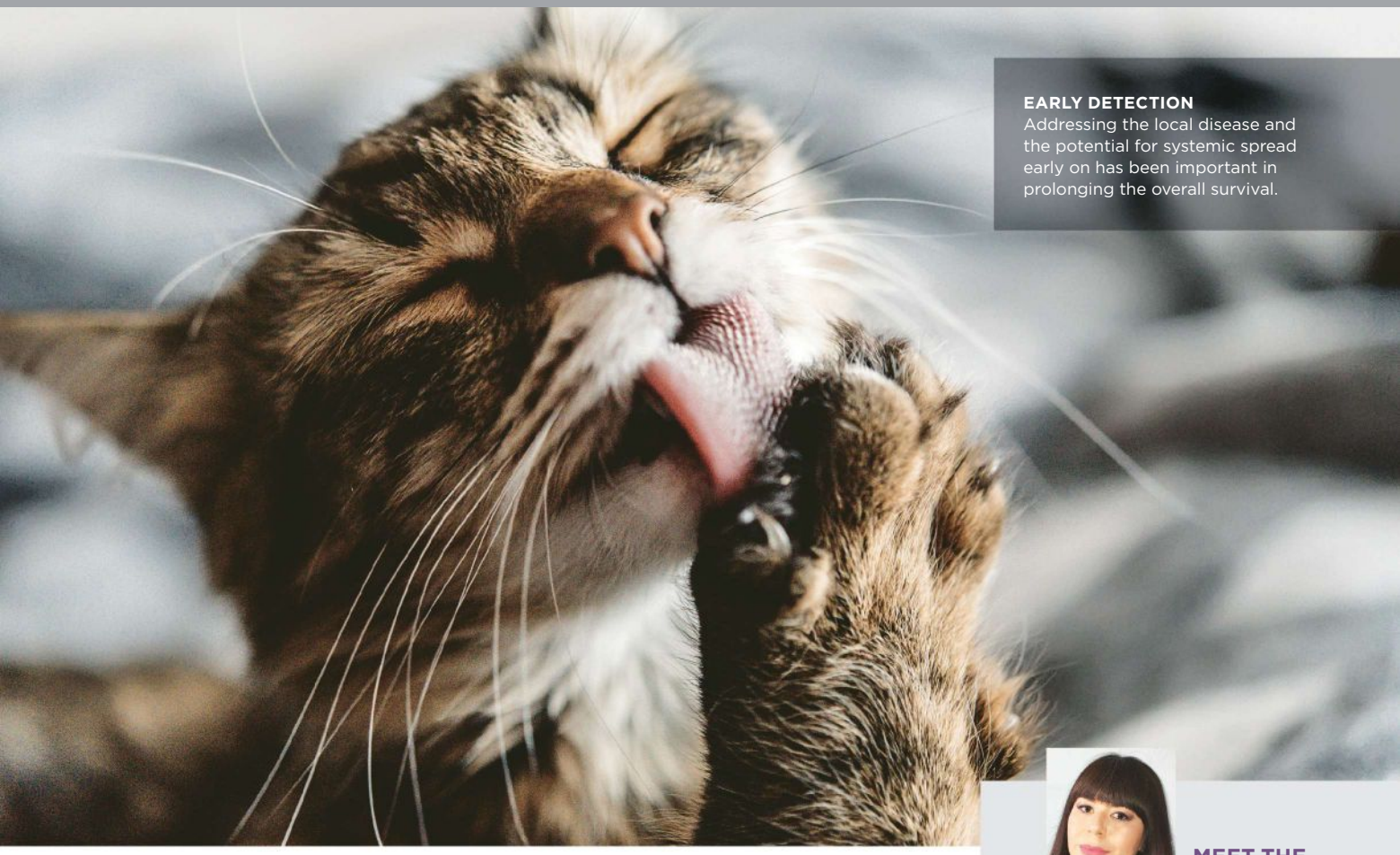

EARLY DETECTION
Addressing the local disease and the potential for systemic spread early on has been important in prolonging the overall survival.

Clinical Progress of Lingual Hemangiosarcoma in a Cat

This case report describes the symptoms, signs, diagnosis, and follow-up of a feline patient with an uncommon oral tumor. The favorable clinical outcome after single-agent doxorubicin chemotherapy and radiation showed that these modalities can be used to manage discomfort and tumor control, improving the quality of life of a patient with lingual hemangiosarcoma.

MEET THE AUTHOR

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Sandra Farfan works in the oncology department at Cornell University Veterinary Specialists in Stamford, Connecticut. Born and raised in Bogota, Colombia, she became a veterinary nurse after moving to Connecticut in 2007. After earning her license in 2013, Sandra began her career in oncology at the Veterinary Cancer Center in Norwalk, Connecticut, as a nurse and nurse supervisor. She has presented case reports at the ACVIM Forum and Veterinary Cancer Society conferences. She is currently a VTS candidate (oncology).

HISTORY

Mojo, a 12-year-old male neutered domestic shorthair cat, presented to the Veterinary Cancer Center for an oncology consultation. The client was seeking further recommendations and treatment of multiple 1- to 2-mm erythematous, purple, raised nodules on the left dorsal and lateral aspects of the tongue. Mojo had previously presented to the referring veterinarian for evaluation of clinical signs related to an oral mass, including difficulty eating his regular dry food, reluctance to drink water, and slight bleeding from the mouth. An incisional biopsy was performed and the sample was submitted to the laboratory. Lingual hemangiosarcoma was diagnosed.

The referring veterinarian also performed staging tests, with the following results:

- Complete blood count
  - Mild anemia
  - Red blood cell count: 3.8 M/µL (normal range, 5.92 to 9.93 M/µL)
  - Hematocrit: 22% (normal range, 29% to 48%)
  - Hemoglobin level: 7.0 g/dL (normal range, 9.3 to 15.9 g/dL)
- Serum chemistry panel and urinalysis: unremarkable
- Thyroxine: within normal limits (1.4 µg/dL; normal range, 0.8 to 4.0 µg/dL)
- Thoracic radiography and abdominal ultrasonography: no evidence of metastasis

INITIAL PHYSICAL EXAM

On physical examination, Mojo was docile, bright, and alert with normal vital parameters. Results of the examination were as follows:

- Weight: 7.34 kg (equivalent to 0.38 m^2)
- Body condition score: 6 of 9
- Temperature: 102.0°F (reference range, 99.5°F/ 37.5°C to 102.5°F/39.1°C)
- Pulse: 204 beats/min (reference range, 120 to 220 beats/min)
- Respiratory rate: 34 breaths/min (reference range: 20 to 40 breaths/min)

Thoracic auscultation was unremarkable; no cardiac arrhythmia or murmur was noted, and lung sounds were clear in all fields. There was no ocular or nasal discharge, and the ears were clean. The throat was normal on palpation. The abdomen was soft and nonpainful. The remainder of the physical examination was unremarkable aside from multiple 1- to 2-mm erythematous, purple, raised nodules on the left dorsal and lateral surface of the tongue (**FIGURE 1**).

CASE MANAGEMENT

Hemangiosarcomas, also known as angiosarcoma or malignant hemangioendothelioma, are an aggressive malignant neoplasm of vascular endothelial origin.[1,2] They are rare in cats and account for <1.5% to 2% of nonhematopoietic neoplasms.[3] These tumors are typically aggressive and tend to metastasize rapidly to different locations, such as the spleen, liver, and bone.

FIGURE 1. Lingual nodules on the left side of the tongue.

Chemotherapy

Given the limited data on this presentation of hemangiosarcoma in cats, the recommended treatment is the same protocol used for the visceral form, which can include surgical and medical intervention, as well as radiotherapy. In Mojo's case, aggressive surgery to obtain a complete excision with wide margins was not feasible because of the small surface area of the tongue and the diffuse nature of the nodules. Radiation was recommended as an adjuvant therapy, but the client initially elected to pursue only chemotherapy. The recommendation was to begin treatment as soon as possible, with the goal of slowing disease progression and prolonging survival. The initial treatment plan consisted of single-agent doxorubicin-based chemotherapy. A total of 5 doxorubicin doses given once every 21 days was recommended. The initial dose would be calculated at 20 mg/m^2 and would be increased to 25 mg/m^2 on the basis of Mojo's response.

Doxorubicin is an anthracycline antibiotic that forms DNA intercalation and inhibits DNA and RNA protein synthesis.[4] Acute side effects can include hypersensitivity reactions due to mast cell degranulation and extravasation injury, which can result in severe tissue damage and necrosis; amputation may be indicated depending on the severity. Doxorubicin hypersensitivity and anaphylaxis reactions in cats usually manifest as respiratory distress, bronchoconstriction, and vomiting. The use of a short-acting steroid, such as dexamethasone, is recommended as premedication. Cumulative doxorubicin dosages can lead to nephrotoxicity in cats and dilated cardiomyopathy in dogs. In cats receiving doxorubicin, renal function should also be monitored. Cats with decreased renal function should receive fluid diuresis before therapy.[4] The most common gastrointestinal toxicities are anorexia and weight loss; vomiting and diarrhea may also occur but are usually mild. Bone marrow suppression is also seen, with a neutrophil nadir occurring at 8 to 11 days.

Radiation Therapy

Mojo returned 3 weeks after starting treatment, and the lesions showed substantial improvement after the first doxorubicin dose. Oral examination showed that the nodules' purple color had faded and that the nodules were palpable only on the dorsal aspect of the tongue.

Because Mojo was responding well to treatment and had started to eat dry food again, the client elected to pursue radiotherapy as well. Four to six doses of hypofractionated radiation therapy was recommended to reduce nodule size and help slow disease progression. (Hypofractionated radiation therapy is delivered once or twice weekly with high doses per fraction for a total radiation dose of 36 Gy or less.) The primary tumor was treated with external-beam radiation therapy using 6-MV photons in parallel opposed fields.

VITAL KNOWLEDGE

Hemangiosarcomas, also known as angiosarcoma or malignant hemangioendothelioma, are an aggressive malignant neoplasm of vascular endothelial origin.[1,2]

Radiation therapy typically increases survival time as well as quality of life. Given his response to chemotherapy, Mojo's prognosis with the addition of radiation therapy was likely to improve, with extension of overall survival time, better quality of life, and improved tumor control.

Hypofractionated radiation therapy to the lower mandible and tongue will typically result in local mucositis and dermatitis. These adverse effects are usually mild and can easily be managed well with pain medications, anti-inflammatory medications, and antibiotics. Cats sometimes need a temporary feeding tube to maintain adequate nutritional intake while the adverse effects resolve. Serious long-term adverse effects are rare but could include local bone necrosis and muscle fibrosis. Late adverse effects do not occur for the first 12 to 18 months. The hair in the local area will fall out toward the end of treatment but regrows in most patients, often a different color (leukotrichia).

Monitoring

Mojo received a total of 5 doses of doxorubicin given every 3 weeks (20 mg/m^2 IV), along with 6 doses of hypofractionated radiation. He was given 5 Gy per

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VITAL KNOWLEDGE

The spleen is the most common primary site of hemangiosarcoma; other sites include the right atrium, subcutaneous tissues, and liver.

fraction in 6 weekly fractions for a total dose of 30 Gy. He experienced no dose-limiting hematologic or gastrointestinal toxicity at any point. After radiation, Mojo developed mild mucositis, which resolved with antibiotics and use of an Elizabethan collar. The patient has been closely monitored via periodic physical examinations and thoracic radiography every 2 months. At each examination, the technician has palpated the lingual lesions and taken photographs in order to monitor and document Mojo's progress during and after treatment.

As of the patient's last visit, approximately 13 months after initial diagnosis, the tongue had a normal color and gross inspection showed no indication of recurrent disease (**FIGURE 2**). The latest thoracic radiographs showed no evidence of metastatic disease.

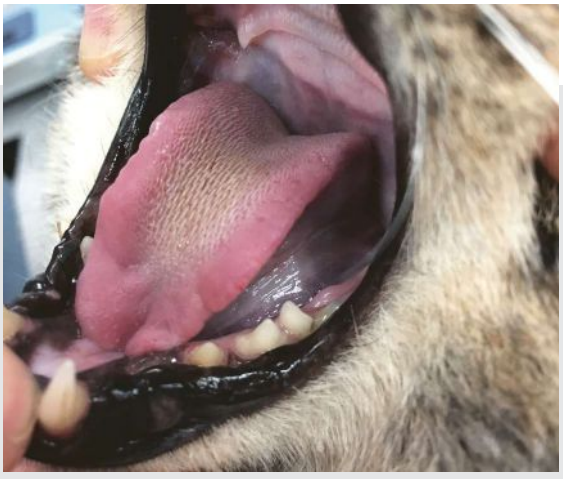

FIGURE 2. Normal appearance of left side of the tongue.

CASE DISCUSSION

The spleen is the most common primary site of hemangiosarcoma; other sites include the right atrium, subcutaneous tissues, and liver. Less commonly, hemangiosarcoma can also arise from tissues such as the tongue, bone, urinary bladder, uterus, kidneys, and retroperitoneum.[1,2] Squamous cell carcinoma is the most common oropharyngeal cancer in cats, followed by fibrosarcoma.[6] It can develop on the internal surfaces of the mouth (e.g. in the tissues around the teeth or on the underside of the tongue). However, the tumors can also originate in nearby tissues, such as the salivary glands or tonsils. Other cancers that may invade the oral cavity in felines, although much less frequent, include lymphoma, osteosarcoma, and melanoma.

There are limited data on the behavior or clinical outcome of hemangiosarcoma of the feline tongue. Feline hemangiosarcoma is relatively rare in cats. The biologic behavior may be similar to that in the canine counterpart; however, case reports of lingual hemangiosarcoma are sparse in veterinary medicine. The metastatic behavior of these tumors in cats is unpredictable and may affect any organ. Addressing the local disease and the potential for systemic spread has been important for obtaining a durable clinical response in most cases. In addition, metastasis may occur early in the disease. With aggressive, multimodality treatment, the survival time may be good and could be greater than 1 year.

Mojo's case is unusual in the context of knowledge about typical feline oral tumors specifically and hemangiosarcomas in general. His outcome is likely due to multiple factors: The small lesions, location, early detection, and chemotherapy in addition to radiation as treatment of choice were all instrumental in Mojo's successful treatment. **TVN**

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