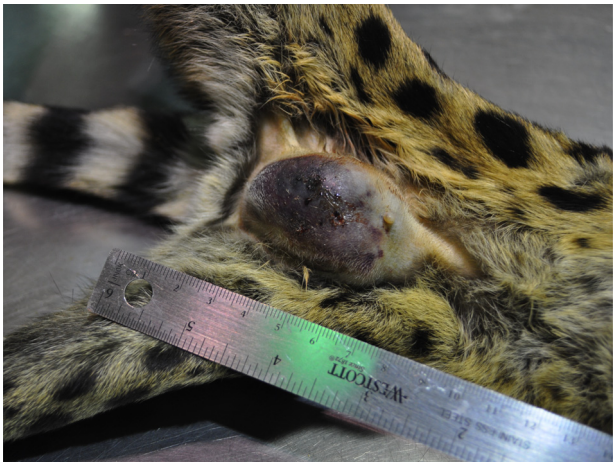

FIGURE 1. Photograph of the patient demonstrating the gross appearance and size of the mammary mass.

History

An 11-year-old intact female genet (*Genetta* sp.) presented to the Zoological Medicine Service at the University of Georgia Veterinary Teaching Hospital (Athens, GA USA) for emergency evaluation of anorexia of 10 days duration. The genet was an indoor only pet with free range of the house and had no vaccination history. The owner noted that the animal had not defecated for 5 days. The genet's diet consisted solely of boiled chicken. Additionally, the genet suffered from a change in mentation over the past week and bit the owner 1 day before presentation.

On physical examination, the patient was quiet, alert, and responsive. The mucous membranes were pale and tacky with a capillary refill time of approximately 2 seconds. The patient was estimated to be 5% to 7% dehydrated and appeared dyspneic. She was cachexic at 1.6 kg with a body condition score of 2 out of 5. A firm, nonulcerated subcutaneous mass was noted in the left inguinal region, measuring 5 × 3 cm^2 (Fig. 1). The remainder of the physical examination was unremarkable. Based on the history and physical examination, the patient was admitted for diagnostic testing and subsequent treatment.

A trash bag was placed around the patient's carrier to facilitate anesthetic induction with isoflurane gas with 5% administered in oxygen at a 4 L/min flow rate. Following induction the patient was intubated and maintained in a surgical plane of anesthesia at 2% isoflurane gas with a 2 L/min flow of oxygen. Anesthetic monitoring included pulse oximeter and capnography. Approximately 5 mL of blood was collected from the cranial vena cava and submitted for a complete blood count (CBC) and serum biochemistry panel. Whole body radiographs (ventrodorsal and right lateral views) were obtained while the patient was anesthetized (Fig. 2). Following the radiographic procedure, the patient had an uneventful recovery from anesthesia.

The CBC and serum biochemistry panel revealed the following abnormalities: anemia (hematocrit 24.2%, reference range: 33.0% to 49.0%), leukopenia (2.2 × 10^3/μL, reference range: 6.2 to 26.10 × 10^3/μL), lymphopenia (0.572 × 10^3/μL, reference range: 2.59 to 14.30 × 10^3/μL), elevated blood urea nitrogen (111 mg/dL, reference range: 14 to 26 mg/dL) and creatinine (2.6 mg/dL, reference range: 0.5 to 0.6 mg/dL), and low alanine transaminase (8 U/L, reference range: 73 to 294 U/L). Additionally, hyperphospatemia (9.1 mg/dL, reference range: 3.2 to 5.8 mg/dL), hypermagnesemia (4.3 mg/dL, reference range: 2.10 to 2.20 mg/dL), and hyperbilirubinemia (0.50 mg/dL, reference range: 0.0 to 0.4 mg/dL) were noted. The reference ranges provided were obtained from the International Species Information System for the Dwarf Mongoose (*Helogale parvula*, March 2002).

At this time, evaluate the history, physical examination findings, CBC and serum biochemistry results, and Figures 1 and 2. Formulate a list of differential diagnoses, prognosis, and treatment plan before proceeding.

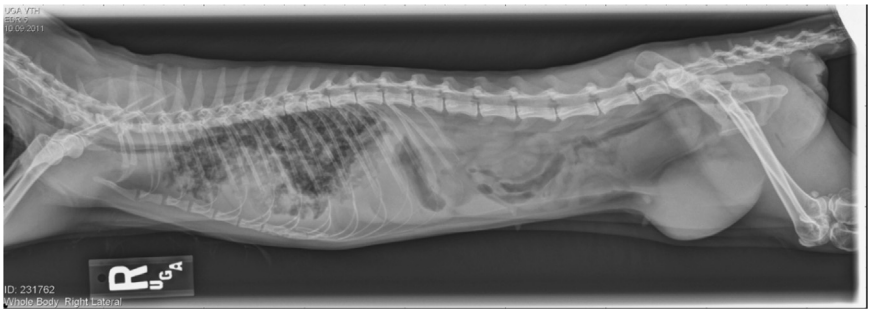

FIGURE 2. Right lateral whole body radiograph of the patient obtained under general anesthesia.

DIAGNOSIS

The whole body radiographic images revealed a large (5.7 × 3.9 cm^2), well defined, smoothly emarginated soft tissue mass in the left caudoventral abdomen. Diffuse lung nodules were noted with a small amount of fluid present in the pleural space. The primary differential disease diagnosis based on the radiographic evidence was neoplasia, specifically carcinoma.

As a result of all the clinical findings, the patient's prognosis was deemed to be poor to grave and the owner elected to euthanize the animal. Necropsy with histopathology was preformed. Gross pathology revealed abnormalities of 4 body systems. Firstly, the left inguinal subcutaneous area contained a 5 × 3.5 cm^2 firm, round, irregular mass. On cut section, the mass was composed of an irregular appearing, brown to pale red, small 1- to 2-cm diameter cortical region surrounding a large, dark red to black medullary area. Secondly, all lung lobes were noted to be firm with multifocal, discrete, white to pale yellow, circular 3- to 4-mm foci, which often bulged above the pleural surface (Fig. 3). Thirdly, multifocal small, circular, 1 to 2 mm red areas were found throughout all liver lobes. Lastly, the left ventricular lumen was mildly narrowed, with mild thickening of the left ventricular wall. The thoracic cavity contained 5 to 8 mL of serosanguinous fluid and small amounts of red foam were present within the distal trachea and proximal bronchi.

On histopathologic examination, the subcutaneous mass was densely cellular, poorly demarcated, multinodular, nonencapsulated, and infiltrative. Tissue obtained from the mass was composed of cells forming tubules and fronds, separated by moderate amounts of fibrovascular stroma. The neoplastic cells were cuboidal to polygonal, within indistinct cell borders, containing moderate amounts of granular eosinophilic cytoplasm and round, centrally located nuclei. Marked pleomorphism of neoplastic cells was identified with increased anisokaryosis and anisocytosis. There were 24 mitotic figures per 10 high powered fields. Neoplastic tubules were multifocally replaced by fibrin and karyorrhectic debris. Similar neoplastic cells were noted within the pulmonary parenchyma, adrenal gland parenchyma, splenic red pulp, renal glomeruli, and hepatic parenchyma.

In summary, necropsy and histopathology revealed a tubulopapillary mammary carcinoma with metastasis to lung, adrenal gland, spleen, liver, and kidney. An additional postmortem finding was mild chronic multifocal lymphoplasmacytic enteritis.

DISCUSSION

An 11-year-old intact female genet was diagnosed with a tubulopapillary mammary carcinoma. The genet's clinical signs were attributable to metastasis of the carcinoma, with the lung metastasis resulting in dyspnea and the renal or hepatic metastasis contributing to the hematologic abnormalities.

Genets are members of the family Viverridae, which also includes civets, binturong, and linsang.[1] Neoplasia is infrequently reported in Viverridae, especially among genets. Case reports of neoplasia in genets include squamous cell carcinoma,[2,3] renal carcinoma,[2] pulmonary adenocarcinoma,[4] and cholangiocarcinoma.[5] Although mammary neoplasia has not been previously reported in genets, there have been 2 reports of mammary masses in the binturong. Effron et al.[6] reported a case of a mammary gland adenocarcinoma in a female intact binturong maintained at the Zoological Society of San Diego. Bjornson et al.[7] reported a mammary carcinoma, arising from the ductal or alveolar epithelium, in a 12-year-old female intact captive binturong.

Several risk factors for mammary neoplasia in animals have been suggested.[8,9] Based on the