ANAL SAC ADENOCARCINOMA WITH METASTASES AND HYPERCALCEMIA IN A FERRET (*MUSTELA PUTORIUS FURO*)

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Abstract

An 8-year-old spayed female domestic ferret (*Mustela putorius furo*) was presented for evaluation of anal prolapse and bilateral enlarged anal sacs. A lobulated mass in the right perianal area was detected during the physical examination. Results of diagnostic blood testing confirmed decreased glucose, potassium, and phosphorus concentrations, and increased total and ionized calcium concentrations. Complete resection of the mass was not possible owing to its nearness to the rectum and the ventral aspect of the tail. Imprint cytological preparations obtained intraoperatively were compatible with anal sac adenocarcinoma, which was confirmed by histopathologic evaluation of submitted tissue samples of the mass. Routine staging showed iliac lymph node and presumptive lung metastases; therefore, chemotherapy was initiated. This report describes a confirmed case of anal sac adenocarcinoma with metastases and hypercalcemia, managed with surgery and chemotherapy for 13 months after the patient's initial presentation and diagnosis. Copyright 2017 Elsevier Inc. All rights reserved.

Key words: anal sac adenocarcinoma; hypercalcemia; chemotherapy; ferret

Anal sac adenocarcinoma (ASAC) is a malignant tumor of apocrine glandular tissue of the anal sac. It is well characterized in dogs, and rarely reported in cats.[1-4] Although ASAC is common in ranch mink, only a single case has been described in ferrets.[5,6] No sex predisposition has been confirmed in dogs and cats, and median age at presentation is 10 and 12 years, respectively.[4,7-10] Similarly, older mink appear to be more susceptible to ASAC.[6] Clinical signs of ASAC in dogs include tenesmus, dyschezia, constipation, or change in stool shape owing to enlargement of the regional lymph nodes; polyuria and polydipsia associated with hypercalcemia; and perineal swelling; and lethargy, anorexia, weight loss, scooting, or excessive perianal grooming.[7,9,11] Treatment for this tumor type in dogs and cats includes surgery, radiation therapy, and chemotherapy, but the overall prognosis is poor. The present report describes a confirmed case of ASAC with metastases and hypercalcemia in a ferret managed with surgery and chemotherapy for 13 months after its initial presentation.

CASE PRESENTATION

An 8-year-old female-spayed domestic ferret was presented to the Fundació Hospital Clínic Veterinari for anal prolapse. Physical examination revealed 5 mm of prolapsed anal mucosa, slight perianal swelling, and enlarged left and right anal sacs. Initial diagnostic tests, including radiographs, blood tests, and fecal analysis, were unremarkable. Anal sac impaction or infection was determined to

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be the top differential in this ferret. The ferret was sedated and both anal sacs were emptied. No discoloration or necrosis of the prolapsed tissue was observed; however, it was replaced, and reprolapse prevented by placing 2 transanal sutures.

The ferret was treated for possible anal sac infection with amoxicillin/clavulanic acid, 20 mg/kg, orally every 12 hours (Synulox, Zoetis, Madrid, Spain); prednisone, 0.5 mg/kg, orally every 12 hours (Dacortin, Merck, Madrid, Spain); and nystatin-neomycin sulfate-thiostrepton-triamcinolone acetonide ointment (Panolog, Novartis, Madrid, Spain) topically. Five days later, the right perianal region was swollen and a lobulated mass was detected (Fig. 1). Surgical exploration was recommended. Diagnostic results of the complete blood count and urinalysis were within normal reference ranges. Abnormal results obtained from the serum biochemistry panel were hypoglycemia, hypokalemia, hypophosphatemia, and increased total and ionized calcium concentrations.

Bilateral extraductal sacculectomy was performed revealing a mass involving the right anal sac, which was near the rectum and the ventral aspect of the tail. The mass was removed by blunt dissection, imprint cytologic preparations were obtained, and the mass was sent for histopathological evaluation.

Imprint cytological samples were of high cellularity and mildy hemodiluted. Bare nuclei were observed throughout the preparations giving the cell population an endocrine/neuroendocrine appearance. Cells were arranged in cohesive clusters with poorly defined cell borders.

FIGURE 1. Caudal view of a right-sided perianal mass at the region of the anal sac detected 5 days after presentation. The lesion was nonulcerated, fixed, and firm on palpation. A small portion of the anal mucosa was prolapsed.

The cytoplasms of the cells were mid- to light-blue, and the nuclei were round to oval with finely stippled chromatin and round to irregular, prominent nucleoli. Anisocytosis and anisokaryosis were moderate to marked (Fig. 2). The cytological interpretation, supported by the location, was compatible with ASAC, although other epithelial neoplasms could not be ruled out.

Histological examination of submitted tissue samples showed an unencapsulated, multilobulated, densely cellular and highly infiltrative neoplasm that extended amply to the cut borders, composed of epithelial cells arranged in a tubuloacinar and solid pattern. The neoplasm was effacing subepithelial connective tissue, replacing normal apocrine glands, infiltrating surrounding muscle bundles, and compressing adjacent ectatic apocrine glands. Neoplastic cells were polyhedral, with a moderate amount of eosinophilic cytoplasm, and a round-to-oval nucleus with fine stippled chromatin and 1 to 3 prominent nucleoli. The mitotic index was intermediate (2 to 3 mitosis per 10 high-power fields) and pleomorphism was high, with marked anisocytosis and anisokaryosis (Fig. 3). The definitive diagnosis was ASAC.

Routine diagnostic staging included 3-view thoracic and abdominal radiographic images, and abdominal ultrasound. Thoracic radiographs revealed a well-marginated soft tissue nodule (Fig. 4), whereas an abdominal ultrasonographic evaluation of the patient provided evidence that the internal iliac and right inguinal lymph nodes were enlarged, presumptive of metastatic spread of the tumor. Ultrasound-guided fine-needle aspirate samples were obtained from both lymph nodes and showed low numbers of lymphoid cells, necrosis, a mixed neutrophilic-macrophagic inflammation, and clusters of epithelial cells with similar features to those described for the perianal tumor consistent with metastatic disease.

Chemotherapy was selected as an adjuvant treatment, and initially consisted of toceranib (3 mg/kg orally every other day, Palladia; Pfizer, Kent, England) and prednisone (0.5 mg/kg orally every 12 hours). The pulmonary nodule was reduced 7 days after the initiation of treatment, and was radiographically undetectable at 20 days of toceranib and prednisone therapy. Ultrasonographic examination of the patient showed progressive reduction of both lymph nodes from the seventh day posttreatment.

One month and 1 week after treatment initiation, the perianal region appeared swollen and the abnormal lymph nodes noted earlier had