



Case Report

Anaplastic Ventricular Adenocarcinoma in a Blue and Gold Macaw (*Ara ararauna*)

Bruno L. Anjos¹, Aline Diefenbach¹, Daniel R. Rissi², Maristela Lovato³,
Tamara Flores³, Larissa Q. Pereira³, Glauca D. Kommers¹

¹Laboratório de Patologia Veterinária, Universidade Federal de Santa Maria, Santa Maria, Brazil.

²Athens Veterinary Diagnostic Laboratory, The University of Georgia, Athens, GA.

³Departamento de Medicina Veterinária Preventiva, Universidade Federal de Santa Maria, Santa Maria, Brazil.

* **Corresponding Author:** Glauca Denise Kommers, Departamento de Patologia, Universidade Federal de Santa Maria (UFSM), Santa Maria, Brazil, LPV-UFSM – Santa Maria, 97105-900, RS, Brazil. E-mail: glaukommers@yahoo.com

Submitted April 1st 2012, Accepted April 27th 2012

Abstract

A case of anaplastic ventricular adenocarcinoma in an adult, female captive blue and gold macaw (*Ara ararauna*) is reported. The bird died suddenly and was submitted to necropsy. The carcass was in poor body condition. A pale, firm neoplastic mass was observed infiltrating the wall of the proventricular-ventricular junction. Histologically, the neoplasm consisted of a poorly demarcated and highly invasive proliferation of cuboidal to columnar neoplastic epithelial cells arranged into small groups and admixed with a dense desmoplastic reaction. Numerous neoplastic cells showed a finely fibrillar, Alcian blue-positive cytoplasmic material. Neoplastic cells were strongly positive for pancytokeratin and negative for vimentin. The diagnosis of anaplastic ventricular adenocarcinoma was based on histological, histochemical, and immunohistochemical findings. These neoplasms are uncommon in psittacine birds and to the best of our knowledge have not been reported in this species.

Key Words: carcinoma, macaw, neoplasms, pathology, psittacine.

Introduction

Gastric adenocarcinomas are very uncommon neoplasms in birds (7) and have been occasionally described in psittacine birds. They are usually characterized by irregular and pale masses or plaque-like lesions, and usually cause digestive tract dysfunction (4). Proventricular and ventricular adenocarcinomas are morphologically similar and both usually occur at the proventricular-ventricular junction (4), although their length may interfere with the accurate identification of the primary site of origin (11). The aim of this report was to describe a case of anaplastic ventricular adenocarcinoma in a blue and gold macaw (*Ara ararauna*) that presented with sudden death. To the best of our knowledge, no previous reports of such tumor have been described in blue and gold macaws.

Case report

An adult female blue and gold macaw was found death in the cage. The bird had been kept in a psittacine preservation facility in Rio Grande do Sul State, Southern Brazil. The carcass was frozen and in poor body condition. The ventricular wall was thickened due to infiltration by an irregular, pale, plaque-like and firm mass measuring 2 x 2 x 1 cm (Fig. 1A). The mass occupied the proventricular-ventricular junction almost entirely. In this area, the koilin membrane was irregular and sloughed off easily. The proventricular mucosa was also thickened. No lesions were observed in other organs.

Tissues were fixed in 10% buffered formalin, routinely processed for histopathology, and stained with hematoxylin and eosin (HE). Sections from the neoplasm

were also stained with Alcian blue (AB) and periodic acid-Schiff (PAS) special stains. Immunohistochemistry was performed based on the streptavidin-biotin-peroxidase method utilizing primary antibodies for pancytokeratin (polyclonal, dilution 1:1.000) and vimentin (monoclonal, dilution 1:100) (DakoCytomation, Carpinteria, California 93013, USA). Counterstaining was performed with Harris hematoxylin and AB.

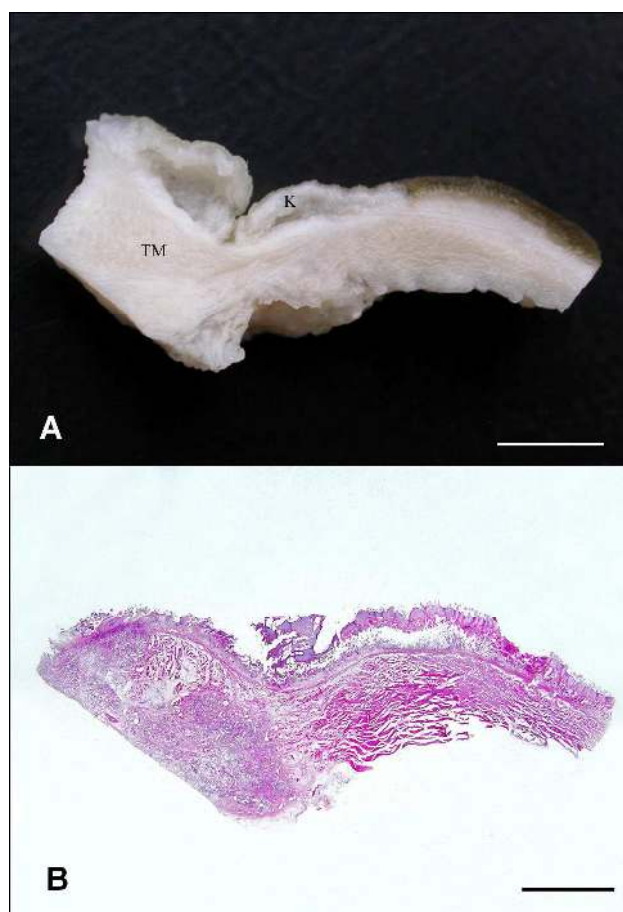


Figure 1. A. Cut surface of the proventricular-ventricular junction of a blue and gold macaw with anaplastic ventricular adenocarcinoma. The gastric wall is focally thickened due to infiltration by pale neoplastic tissue (TM). The koilin membrane (K) is irregular and disrupted. Bar = 1.5 cm. B. Sub gross photomicrography of the same area shown in figure 1. Neoplastic cells (left) form a poorly demarcated, highly invasive, and transmural neoplasm embedded into a dense desmoplastic reaction. Bar = 1.5 cm.

Microscopically, the neoplasm consisted of a poorly demarcated, highly invasive, and transmural proliferation of neoplastic epithelial cells admixed with a dense desmoplastic reaction (Fig. 1B). Neoplastic cells were arranged in small groups (Fig. 2A) and had moderate amount of cubic to polygonal, slightly eosinophilic cytoplasm. Numerous cells presented with a slightly fibrillar AB-positive and PAS-negative intracytoplasmic secretory material. Nuclei were round to oval, centrally

located, and composed of dense chromatin and prominent nucleoli. Mitoses were frequent (2 per high power field at 400 x), and anisocytosis and anisokaryosis were marked. Groups of neoplastic cells were observed in the lumen of lymphatic vessels in the ventricular submucosa. Immunohistochemical examination revealed strong cytoplasmic labeling of neoplastic cells for pancytokeratin (Fig. 2B). Only the stromal cells were positive for vimentin, confirming the epithelial origin of the neoplasm.

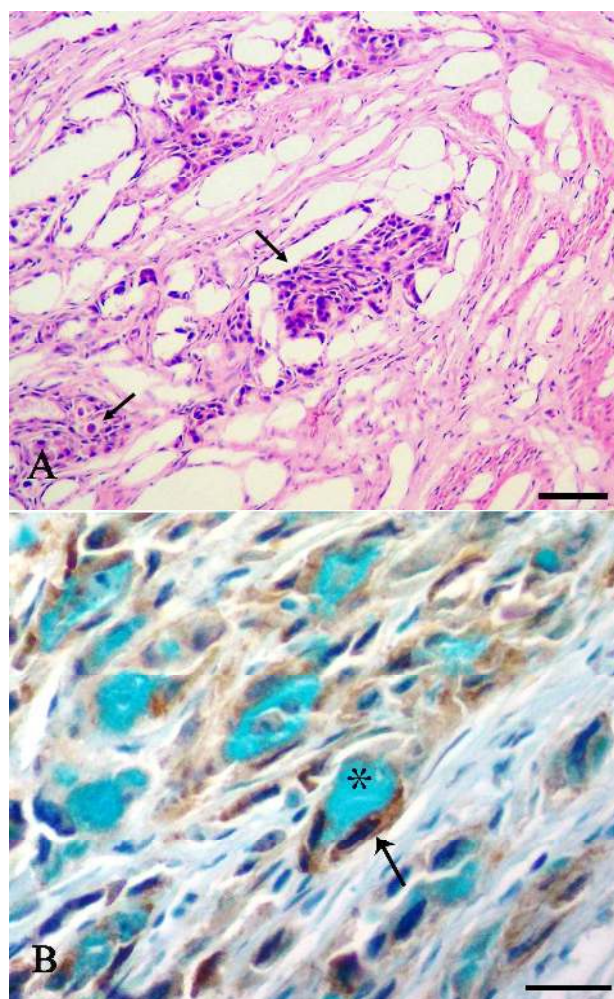


Figure 2. A. Nests of neoplastic epithelial cells are observed admixed with a dense fibrous connective tissue (arrows). The clear spaces correspond to freezing artifacts. Bar = 80 μ m. B. The same neoplastic cells show strong cytoplasmic immunostaining for pancytokeratin (arrow). Some of these cells contain cytoplasmic, Alcian blue-positive secretory material (asterisk). Bar = 20 μ m

Discussion

Gastrointestinal neoplasms are uncommon in psittacine birds (3, 8, 9). Adenocarcinomas and carcinomas in psittacines have been described in the proventriculus, ventriculus (2, 4, 5), intestine, and cloaca (10). In this case, the diagnosis of anaplastic ventricular

adenocarcinoma was based on histological, histochemical, and immunohistochemical findings. It has been shown that histochemical findings are determinant in the differentiation between the proventricular and ventricular origin of gastric neoplasms in birds (4, 12). The observation of groups of neoplastic cells presenting AB-positive cytoplasmic staining similar to normal ventricular secretory products (koilin) confirmed the ventricular origin of the neoplasm (4) in the present case. Proventricular adenocarcinomas show red-purple, PAS-positive mucous secretion instead of the AB-positive basophilic substance (12).

Despite the reported invasiveness of these neoplasms, metastases are not frequent in gastric adenocarcinomas of psittacine birds (4). Sites of metastases include lungs and pancreas (1,4), but no organ involvement other than the proventriculus and ventriculus was observed in the present case. Birds with gastric adenocarcinomas usually exhibit weakness, inability to perch, head tilt, dark stools or stools with indigested food, beak overgrowth, and polyuria. Anemia and hypoproteinemia have been described as common hematological findings (4). Although no specific clinical signs were reported by in this blue and gold macaw, the body wasting presented by the bird was not surprising, since the neoplasm occupied almost completely the proventricular-ventricular junction, which most likely caused partial gastrointestinal obstruction, with consequent cachexia and death (6).

References

1. CAMPBELL TW., TURNER O. Carcinoma of the ventriculus with metastasis to the lungs in a sulphur-crested cockatoo (*Cacatua galerita*). **J. Avian Med. Surg.**, 1999, 13, 265-68.
2. GIBBONS PM., BUSCH MD., TELL BL., Graham JE., Lowesntine LJ. Internal papillomatosis with intrahepatic cholangiocarcinoma and gastrointestinal adenocarcinoma in a peach-fronted conure (*Aratinga aurea*). **Avian Dis.**, 2002, 46, 1062-69.
3. LANGOIS I. The anatomy, physiology, and diseases of the avian proventriculus and ventriculus. **Vet. Clin. Exot. Anim.**, 2003, 6, 85-111.
4. LEACH MW., PAUL-MURPHY J., LOWENSTINE LJ. Three cases of gastric neoplasia in psittacines. **Avian Dis.**, 1989, 33, 204-10.
5. LEACH MW. A survey of neoplasia in pet birds. **Semin. Avian Exotic Pet Med.**, 1992, 1, 52-64.
6. MORRISEY JK. Gastrointestinal diseases of psittacine birds. **Semin. Avian Exotic Pet Med.**, 1999, 8, 66-74.
7. RAE MA., MENNNAN M., LINTUER M. Gastric neoplasia in caged birds. **Proc. Assoc. Avian Vet.**, 1992:180-89.
8. RAMSAY E., MITCHELL F., JOHN M. Clinical challenge: Proventricular adenocarcinoma in a double yellow-head Amazon parrot (*Amazona ochrocephala*). **J. Zoo Wildl. Med.**, 1991, 22, 263-64.
9. SCHMIDT RE., REAVILL DR., PHALEN N. **Pathology of pet and aviary birds**. Iowa: Blackwell, 2003.
10. SCHMIDT RE. Morphologic diagnosis of avian neoplasms. **Semin. Avian Exotic Pet Med.**, 1992, 1, 73-9.
11. SCHMIDT RE. Pathology of Gastrointestinal Diseases of Psittacine Birds. **Semin. Avian Exotic Pet Med.**, 1999, 8, 75-82.
12. YONEMARU, K., H. SAKAI, Y. ASAOKA, T. YANAI, H. FUKUSHI, K. WATANABE, K. HIRAI AND T. MASEGI. Proventricular adenocarcinoma in a Humboldt (*Sheniscus humboldti*) and a great horned owl (*Bubo virginianus*); identification of orient by mucin histochemistry. **Avian Pathol.**, 2004, 33, 75-9.