

# ABNORMAL BUOYANCY IN A CONVICT CICHLID (*AMATITLANIA NIGROFASCIATA*) ASSOCIATED WITH AN OVARIAN CARCINOMA INVADING THE SWIM BLADDER



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## Abstract

An 8-year-old female convict cichlid (*Amatitlania nigrofasciata*) was presented to the University of Wisconsin Veterinary Medical Teaching Hospital with a 2-month history of abnormal buoyancy; the fish spent most of its time in lateral recumbency on the aquarium substrate. During the initial visual examination of the patient in its transport aquarium, the fish was laterally recumbent on the bottom of the tank and had a mildly distended coelom. A transient response to empirical florfenicol therapy was reported, but the cichlid presented 1 month later in poor body condition and, again, in lateral recumbency. Owing to the poor prognosis, the fish was humanely euthanized and a necropsy was performed. The histopathologic results were consistent with a papillary carcinoma originating in the ovary, which invaded the caudal kidney and the swim bladder. The infiltration of the carcinoma into the swim bladder was suspected to be the primary cause of the clinically observed buoyancy abnormality. Copyright 2016 Elsevier Inc. All rights reserved.

**Key words:** ovarian papillary carcinoma; swim bladder; convict cichlid; *Amatitlania nigrofasciata*

A privately owned, 8-year-old female convict cichlid (*Amatitlania nigrofasciata*) was presented to the University of Wisconsin Veterinary Medical Teaching Hospital's Special Species Health Service with a 2-month history of abnormal buoyancy. The cichlid was housed in a 36-gallon tank with 2 other convict cichlids. The water was filtered and regularly tested for ammonia and nitrates, and 25% of the water was changed every other day. The owner attempted therapy at home by treating the water with tea tree oil, salt, and over-the-counter triple sulfa antibiotic powder with no improvement. The first abnormality of the cichlid reported by the owner was a buoyant fish with its head directed up toward the surface of the water (positive buoyancy), but it appeared to have a normal appetite. However, at the time of presentation, the patient was negatively buoyant in left lateral recumbency on the tank bottom, but remained appropriately responsive to manipulation. During the physical examination, the cichlid had a distended coelom and increased respiratory rate. Skin, fins, and gill color all appeared to be within normal limits. Differential diagnoses at this time included swim bladder bacterial infection or neoplasia.

Diagnostic options for the fish included routine gill biopsy, imaging, and swim bladder aspiration with cytology and aerobic/anaerobic bacterial

culture. The diagnostic test recommendations were initially discussed with the owner. However, all tests were declined and the owner elected to

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attempt empirical treatment with low-concentration salt bath and antibiotic therapy. While in the hospital, the fish received florfenicol 1.0 mg intramuscularly (40 mg/kg; Nuflor, Merck Animal Health, Madison, NJ USA), and was prescribed a florfenicol gel food recipe for the owner to prepare and feed daily to the fish (1500 mg of florfenicol added to 750 g of food; Nuflor, Merck Animal Health, Madison, NJ). The owner was also instructed to place the fish in a hospital tank without filtration, and increase salinity (3 g of sea salt per liter of water) for 7 days. The owner was given a guarded to poor prognosis for the fish to recover, and euthanasia was discussed pending response to therapy.

One month later, the cichlid represented to the University of Wisconsin-Veterinary Medical Teaching Hospital-Special Species Health Service. The fish had reportedly improved following florfenicol therapy and had been able to swim with normal buoyancy for several days. However, the negative buoyancy condition had recently returned. On presentation, the cichlid was in left lateral recumbency on the bottom of the tank. The fish was also in thin body condition and had mild cloacal prolapse. Owing to the lack of funds and a poor prognosis, the owner elected euthanasia. The patient was euthanized with eugenol (100 mg/mL) in bath solution (500 mg/L water) followed by intracardiac administration of 0.1 ml concentrated pentobarbital (Beuthanasia, Merck Animal Health, Madison, NJ). The body of the cichlid was submitted for necropsy.

## **PATHOLOGY**

A necropsy was performed within 2 hours of euthanasia. The fish was in good postmortem condition and poor nutritional condition, with scant adipose stores and a body weight of 23.4 g. A gill wet mount and a skin scraping were negative for parasites. The cloaca was mildly prolapsed. The coelom contained 1.5 mL of clear pink-tinged watery fluid. The caudal swim bladder was cranially effaced and mostly filled by a large, soft mass measuring  $2.0 \times 2.0 \times 1.5 \text{ cm}^3$  (Fig. A). The cranial aspect of the mass was dark brown, friable, granular, and partially replaced the ovary. The caudal two-thirds of the mass was covered in a thin iridescent membrane (remaining swim bladder), which was tightly adhered cranially to the mass. The portion of the mass within the swim bladder was soft to friable and pale pink to white (Fig. B). The cranial lobe of the swim bladder was intact and air-filled, but had multifocal, thin, translucent foci in the ventral wall. The gastrointestinal tract was displaced cranially and

was empty, and the liver was markedly decreased in size and was uniformly dark tan.

The harvested tissue samples were fixed using buffered 10% formalin and processed routinely for light microscopy. Tissue sections were stained with hematoxylin-eosin (H&E). Effacing portions of the ovary, swim bladder, and the caudal kidney was a poorly demarcated, unencapsulated, moderately invasive mass composed of cuboidal to columnar cells arranged in papillary structures (Fig. C), and supported by small to moderate amounts of fibrovascular stroma. In some areas, rather than papillary structures, the cells formed dense solid sheets of polygonal cells (Fig. D), which had a tendency to be more invasive. The cells in the papillary population had distinct borders, moderate amounts of eosinophilic cytoplasm, and an oval nucleus with finely stippled chromatin and occasionally a prominent nucleolus. Anisocytosis and anisokaryosis were moderate in this population. Multifocally, the cells were polygonal and arranged in dense solid sheets, with distinct cell borders, large amounts of eosinophilic cytoplasm, and contained an oval nucleus with finely stippled to vesiculated chromatin and a prominent magenta nucleolus. In this population, anisocytosis and anisokaryosis were marked, and there were occasional multinucleated cells. Mitotic figures were 2 per 10,  $\times 400$  fields. The ovary contained many atretic follicles and moderate amounts of granulomatous inflammation. Additional histopathologic findings included moderate melanomacrophage hyperplasia of the liver, spleen, and cranial kidney, as well as mild multifocal granulomatous inflammation of the mesentery and spleen. Infectious organisms were not observed on H&E or Fite acid fast stain.

## **DISCUSSION**

The large coelomic mass was consistent with a papillary carcinoma, with morphologic variation of solid carcinoma in some regions. The mass appeared to originate in the ovary, presumably from germinal epithelium, with local invasion of the swim bladder. Origination in the swim bladder, from respiratory epithelium, with invasion into the ovary is also possible, and the location spanning the junction between the 2 organs made precise determination of tumor origin difficult. In general, more of the ovary was involved than the swim bladder, and well-differentiated neoplastic cells resembled ovarian germinal epithelium over that of the swim bladder mucosal epithelium. Buoyancy changes observed clinically were likely because of infiltration of the swim bladder by this neoplasm.

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