Case Report

Nephroblastoma in a Koi (*Cyprinus carpio*)

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Abstract

A cachexic 2-year-old koi (*Cyprinus carpio*) presented with progressive distension of the coelom (1-month period) and anorexia of 2 days' duration. The fish had been maintaining a normal swimming position, although it was often observed low in the water column. Water quality was within normal limits. A skin scrape, fin clip, and gill clip were unremarkable. The respiration rate (opercular movement) was elevated at 100 breaths per minute. Blood chemistry values demonstrated a hypoalbuminemia (1.3 g/dL), elevated uric acid (1.3 mg/dL), elevated creatine kinase (>14,000 U/L), and hyperkalemia (3.9 mmol/L). Ultrasound revealed a fluid-filled coelom and a soft tissue mass containing large vessels filling most of the coelomic cavity. Fine-needle aspirates of the mass were nondiagnostic, though a poorly exfoliating mesenchymal tumor was suspected. The mass was surgically excised. Pathological examination of the mass revealed it to be a poorly demarcated and unencapsulated neoplasm forming 3 histological patterns in which a spindle cell stromal component predominated over an intermediate-sized blastema and much smaller tubular patterns. These features were most consistent with a nephroblastoma. The koi survived 5 days postoperatively but remained low in the water column and was found dead on day 6. A full necropsy of this patient was not performed. © 2010 Published by Elsevier Inc.

Key words: **carp; *Cyprinus carpio*; kidney tumor; koi; nephroblastoma; renal neoplasia**

A 2-year-old koi weighing 720 g presented to the Texas A&M Veterinary Teaching Hospital with a progressive bilateral distension of the coelom (1-month period) and anorexia of 2 days' duration (Figs 1 and 2). The fish maintained a normal swimming position but remained low in the water column. The animal had been obtained by the current owner approximately 6 months before presentation and was kept with 20 other koi in an approximately 30,000-L pond in southeastern Texas. No other fish in the pond from which the koi was removed showed clinical signs of disease. The pond had been established for 5 years and underwent a weekly 10% water change. Synthetic grass had been placed in the pond to encourage spawning behavior without apparent effect on this patient or the other fish. The water temperature was 21.6°C (70.9°F) at the time of presentation. Water quality monitoring for the pond was performed monthly or every other month. It took over an hour for the fish to be moved

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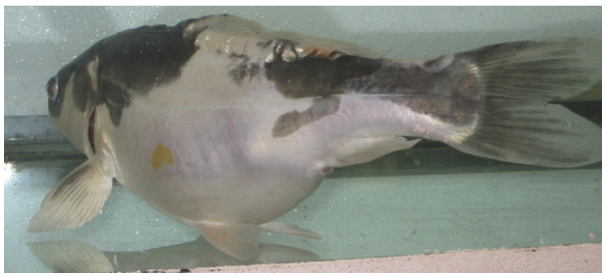

Figure 1. Koi on presentation. Note the coelomic distension.

from its pond to the veterinary teaching hospital; however, the transport water was considered to be within normal limits when tested at the time of the examination.

On physical examination, there was an expansion in the caudal coelom followed by a thinned caudal peduncle. The animal was emaciated, with a loss of tissue mass over the dorsum. Diagnostic test results from a skin scrape, gill clip, and fin clip were unremarkable. Respiratory rate (opercular movement) was elevated at 100 respirations per minute,[1] though no gill abnormalities were noted. The patient had two 1- to 2-mm areas of darkened, thickened discoloration on her distal caudal fin. All other parameters on physical examination were within normal limits. To further investigate reproductive disease as the possible underlying cause of the coelomic distension, an ultrasound examination was performed focusing on the effected body area.

The animal was placed in a water-filled plastic bag for ultrasonic examination. The ultrasound images revealed fluid in the coelomic cavity and a soft tissue mass nearly filling the entirety of the caudal coelomic cavity (Fig 3). Large vessels running through the mass were also observed. Doppler ultrasonography was used to verify active vasculature within the mass, which in all likelihood was neoplastic based on the information gathered through diagnostic testing. No

Figure 2. Dorsal view of koi, displaying pronounced thinning of the caudal peduncle.

Figure 3. Ultrasound of the coelom. Note the large oval soft tissue mass.

obvious eggs or gonadal tissue were identified within the coelomic cavity. The koi was sedated to effect with tricaine methane sulfonate (MS222/Finquel; Argent Chemical Laboratories, Redmond, WA USA) and rolled into a lateral position. A fine-needle aspirate of the coelomic mass was performed with a 23-gauge needle attached to a 5-mL syringe from the severely distended caudolateral aspect of the body cavity. Three milliliters of serosanguinous fluid were harvested with the fine-needle aspirate (Fig 4). Cytologically, the aspirate contained few intact nucleated cells, and numerous erythrocytes were observed in a thick, hazy proteinaceous background. The nucleated cells were mostly composed of small lymphocytes. Rare thick, disrupted aggregates of cells were noted and appeared to be composed of a relatively uniform, monomorphic population of cells. In addition, rare small aggregates of 3 to 4 uniform spindle cells were present. It was concluded that the sample was not diagnostic; however, a poorly exfoliating mesenchymal tumor could not be ruled out. Based on these results, exploratory surgery was suggested and agreed to by the owner, despite a poor prognosis.

Blood was collected from the caudal tail vein for diagnostic hematological testing and assessed with a

Figure 4. Lateral approach for mass aspirate.