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## Clinical Reports

# Bilateral Testicular Germ Cell–Sex Cord–Stromal Tumor in a Pekin Duck (*Anas platyrhynchos domesticus*)

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**Abstract:** An intact male white pekin duck (*Anas platyrhynchos domesticus*) was presented for examination because of respiratory distress and 2- to 3-month history of lameness and lethargy. Results of radiography, ultrasonography, and cytologic examination revealed a large neoplastic mass in the coelom. The duck was euthanatized, and results of necropsy revealed 2 large, lobulated masses in the coelom and a small nodule on the liver. Histopathologic examination of the large masses revealed a collision pattern testicular tumor consisting of Sertoli, seminoma, and interstitial cell components. The hepatic nodule was a metastatic lesion consistent with a Sertoli cell testicular tumor. This is the first reported case of a mixed germ cell–sex cord–stromal tumor in a duck.

**Key words:** testicular tumor, neoplasia, dyspnea, avian, duck, *Anas domesticus*

### Clinical Report

An intact male white pekin duck of unknown age but presumed to be an adult presented to the Texas A&M University Veterinary Medical Teaching Hospital with a history of respiratory distress for 1 day and lameness and lethargy for 2–3 months. On physical examination, the bird was bright, alert, and responsive and weighed 2.43 kg. The heart rate was 156 beats per minute, and the respiratory rate was 24 breaths per minute. Crackles were auscultated in the area of abdominal air sacs and lungs. The duck exhibited right leg lameness, but no heat, swelling, or erythema were evident. Other abnormalities observed were watery feces and mild crusting along the commissures of the beak and in the nares. A blood sample was collected for initial measurement of the packed cell volume (PCV) and total solids concentration. The remaining sample was sub-

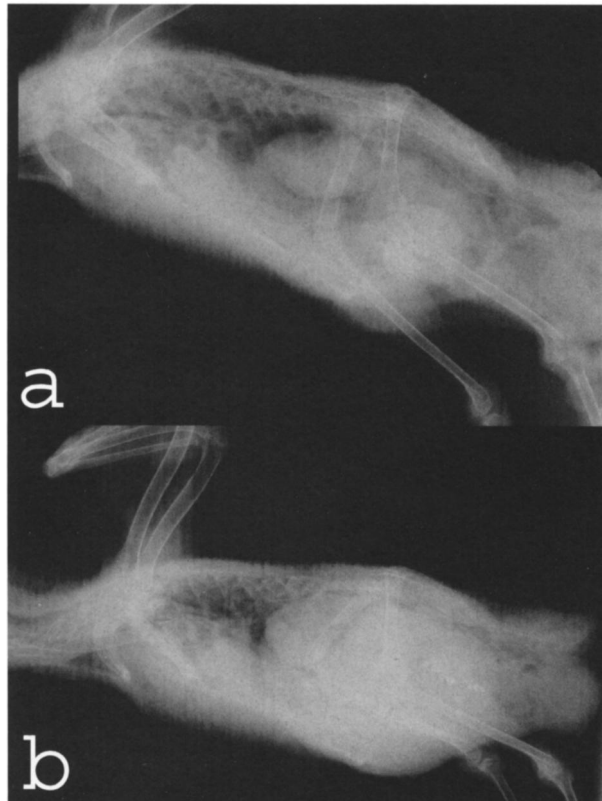
mitted for a complete blood count (CBC) and plasma biochemical analysis, and a fecal Gram's stain was performed. Radiographic imaging was recommended but declined by the owner.

Results of the blood tests revealed the duck was mildly anemic (PCV = 35%; reference range, 35%–50%)<sup>1</sup> and possibly hyperproteinemic (total serum solids concentration, measured with a non-temperature-compensated refractometer, 6.6 g/dl; reference range, 3.49–5.5 g/dl).<sup>1</sup> Results of the CBC and plasma biochemical analysis were unremarkable, and results of the fecal Gram's stain revealed predominantly gram-positive flora. Because rule-outs for the bird's clinical presentation included aspergillosis and because the flock had a history of pasteurellosis, enrofloxacin (15 mg/kg PO q12h; Baytril, Bayer Corp, Shawnee Mission, KS, USA) and itraconazole (50 mg/kg PO q24h; Sporonox, Janssen Pharmaceutical, Beerse, Belgium) were prescribed, and the duck was discharged.

The duck presented the next week with no reported improvement in clinical signs. On examination, it was bright, alert, and responsive and the heart and respiratory rates were essentially unchanged; however, on this presentation, the air sacs and lungs were clear on auscultation. Crusting was no longer evident around the beak

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**Figure 1.** Left lateral radiographs of an adult male white pekin duck that presented for tachypnea, lethargy, and lameness. (a) This radiograph was taken 3 months before presentation. (b) A large soft tissue mass in the dorsal coelomic cavity is displacing the proventriculus and liver ventrally.

or in the nares, but the duck was still lame. A blood sample was submitted for repeat CBC and plasma biochemical analysis, the results of which were again within reference intervals. The duck was anesthetized with isoflurane, and radiographs were performed. Ventrodorsal and right lateral radiographs of the coelom were taken and compared with radiographs performed 3 months earlier. Current radiographs revealed a large elliptical soft tissue mass in the dorsal coelomic cavity, which was displacing the proventriculus and liver ventrally (Figs 1 and 2). Degenerative changes were observed in the left and right tibiotarsal and tarsometatarsal joints. Ultrasound examination and fine-needle aspiration of the coelomic mass were scheduled for the next week. Treatment with enrofloxacin and itraconazole was continued, and meloxicam (0.1 mg/kg PO q24h; Metacam, Boehringer Ingelheim Vetmedica, St Joseph, MO, USA) was added for pain control.

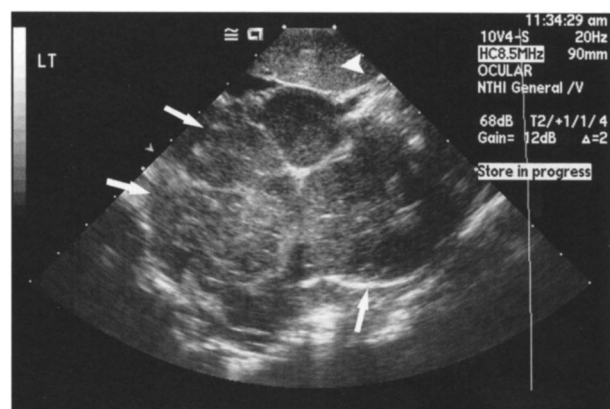
Radiographs taken 4 days later confirmed that the size, shape, and location of the mass had not



**Figure 2.** Comparative ventrodorsal radiographs of the duck described in Figure 1. The radiograph in Figure 2a was taken 3 months before that in Figure 2b.

changed. Coelomic ultrasound demonstrated a hypoechoic multilobulated mass adjacent to the liver (Fig 3). Vasculature supplying the mass appeared to lead from the dorsal body wall. The mass was presumed to either be associated with the liver or originating from the dorsal coelomic cavity and displacing the liver ventrally. A hypoechoic nodule was also identified in the liver. Three fine-needle aspirates from the hepatic nodule were obtained with a 22-gauge needle and were submitted for cytologic analysis.

Examination of the hepatic aspirate revealed large neoplastic round cells with pleomorphic nuclei, clumped pale pink cytoplasm, prominent variably sized nucleoli, and multiple mitotic figures. The initial cytologic interpretation from



**Figure 3.** Ultrasonographic image of the coelomic mass described in Figure 1. The multilobulated mass (white arrows) with mixed echogenicity was adjacent to the liver parenchyma (white arrowhead).



**Figure 4.** Gross necropsy photograph of 2 distinct, multilobulated masses found in the renal/gonadal region along the dorsal body wall and to the left and right of midline in the duck described in Figure 1.

the hepatic aspirate was large cell lymphoma. Treatment options, including surgical excision and medical management with chemotherapeutics, were discussed with the owner and declined. Four days later, the duck presented to the Texas A&M University Veterinary Medical Teaching Hospital in severe respiratory distress, and the owner opted for euthanasia. The carcass was submitted for necropsy.

On postmortem examination, the liver was enlarged and displaced caudally and contained 2 pale nodules measuring 4 mm and 7 mm in diameter, respectively. Two separate, large, multilobulated, elliptical masses were found in the renal/gonadal region along the dorsal body wall and to the left and right of midline (Fig 4). Both masses were attached to the dorsal body wall by small blood vessels. The left abdominal mass measured 8 cm in length and 3.5 cm in width at its midpoint, with the poles measuring 1.5 cm and 1 cm in diameter, respectively. The mass was pale, gray, and soft but slightly fibrous. The right abdominal mass, with a consistency and color similar to that of the left, measured 14 cm in length and 4 cm in width at its midpoint, and the poles measured 1.5 cm and 2 cm in diameter, respectively.

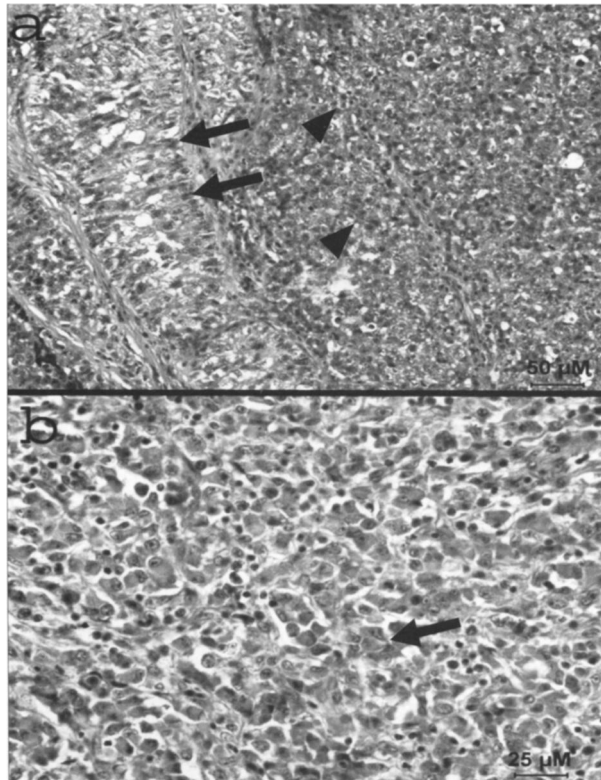
Histopathologic examination revealed that both abdominal masses were composed of neoplastic testicular tissue. Several patterns of neoplastic cells were present in each mass where they collided and effaced most of the original architecture of the seminiferous tubules. The Sertoli cell component, the slightly lesser of the 2 major neoplastic cell components involving

both testes, was recognized by a pattern of elongated tubules set in a dense fibrous stroma. Thin, elongated neoplastic cells were aligned perpendicular to the tubular basement membrane and spanned the lumen of former seminiferous tubules where they had replaced the normal cellular lining. The predominant neoplastic component in both testicular masses was a round cell tumor having histologic and cytologic features of a seminoma. Large round neoplastic cells distended the seminiferous tubules and formed nodular and extensive sheet-like extratubular masses. Diffuse sheets of these cells occasionally contained small-caliber blood vessels surrounded by small lymphocytes. At several locations in each testicle where the 2 neoplastic cell populations intermingled or had collided, neoplastic seminoma cells appeared to have infiltrated and effaced the tubular pattern of the Sertoli cell tumor; however, the preexisting fibrotic stroma persisted (Fig 5a). Small interstices in both testicular tumors contained small, irregular sheet-like collections of angular neoplastic cells, which demonstrated eosinophilic to orange staining and contained granular to microvacuolated cytoplasm. These islands of neoplastic cells were bordered by, but did not appear to commingle with, the other 2 more distinctive neoplastic cell populations (Fig 5b). This much smaller infiltrate of neoplastic cells had the cytologic and histologic features of an interstitial cell tumor. Neoplastic Sertoli cells had invaded small-caliber veins and lymphatics in the thickened tunica albuginea of the testicles and metastasized to the liver.

### Discussion

In this report, we describe dyspnea, lameness, and lethargy in a duck with bilateral mixed germ cell–sex cord–stromal testicular tumors. The clinical signs reported can be attributed to the mass effect of the tumor displacing and compressing the coelomic organs. The case illustrates the need for early detection to most effectively treat coelomic masses. Ultrasound and serial plain radiographs were important diagnostic tools in this case and should be considered part of a thorough diagnostic evaluation in avian medicine.

Reports of neoplasia in wild birds are uncommon; however, this may be because of underrepresentation due to various factors such as death from unrelated causes and lack of thorough diagnostic workups. Most reported neoplasms in birds have been in Psittaciformes, notably in budgerigars (*Melopsittacus undulatus*), whereas



**Figure 5.** Photomicrograph of a mixed germ cell–sex cord–stromal testicular tumor in the duck described in Figure 1 (hematoxylin and eosin stain). (a) A collision pattern tumor consisting of a Sertoli cell tumor (composed of characteristic elongated tubules within a dense fibrous stroma [black arrows]) and a seminoma (identified by the homogenous population of large round cells with central hyperchromatic nuclei [black arrowheads]) (bar in inset = 50  $\mu\text{m}$ ). (b) An interstitial cell tumor composed of angular neoplastic cells (black arrow) containing characteristic eosinophilic to orange staining cytoplasm (bar in inset = 25  $\mu\text{m}$ ).

very few have been reported in ducks.<sup>2</sup> The low prevalence of tumors in the white pekin duck in particular may be because of years of selective breeding, which has genetically reduced the incidence of spontaneously occurring tumors.<sup>3</sup> Two cases of seminomas<sup>4,5</sup> and one case of a Sertoli cell tumor have been documented in ducks.<sup>6</sup>

The testes are comprised of both germ cell and sex cord components, either of which may become neoplastic; however, rarely does a single tumor consist of both cell types. Such tumors are most accurately classified as mixed germ cell–sex cord–stromal tumors<sup>7,8</sup> and have been described in humans, dogs,<sup>9</sup> and horses.<sup>10</sup> In people, these tumors are usually composed of germ cells, Sertoli cells, interstitial cells, and granulosa-like cells, whereas those reported in dogs consist of only

germ cells and Sertoli cells.<sup>9</sup> The tumor reported in this case had distinct populations of neoplastic cells that resembled seminomas, Sertoli cells, or interstitial cells. A dense scirrhous tissue response is a common feature of Sertoli cell tumors in domestic mammals, and diffuse sheets of neoplastic seminoma cells containing blood vessels surrounded by small lymphocytes are common components of seminomas in domestic animals. Both findings were observed in this case.

Although there is no current classification in animals for neoplasms consisting of both sex cord and germ cell components, in humans these tumors are classified in 2 categories: gonadoblastomas and true mixed germ cell–sex cord–stromal tumors.<sup>9</sup> In humans, gonadoblastomas are often functional tumors producing sex hormones and are associated with abnormal sexual development. In contrast, mixed germ cell–sex cord–stromal tumors occur in phenotypically and genotypically normal individuals.<sup>9</sup>

The treatment of choice for abdominal tumors in many animals is surgical excision; however, surgical resection of testicular masses in birds is more difficult because of the short vascular supply to the testes.<sup>11</sup> In male birds, important differentials for a coelomic mass other than testicular neoplasia include renal neoplasia, orchitis, adrenal neoplasia, and normal variations in testicular size coincident with the breeding season.

Clinical signs of hepatic dysfunction or respiratory distress may be important indicators of a coelomic mass that has physically displaced and compressed abdominal viscera; however, the mass can grow considerably before these signs present. Reliance on clinical signs alone may not be sufficient to accurately diagnose and treat testicular tumors. Early detection by routine physical examination and diagnostic imaging may facilitate successful surgical removal of such masses before tumor enlargement obstructs the supporting vasculature.

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