Answer Sheet

Title: Ovarian adenocarcinoma with carcinomatosis and egg-yolk peritonitis in a chicken.

Contributors: Tamires Goneli Wichert Teodoro¹,², DVM; Tatiane Terumi Negrão Watanabe², DVM, MS, PhD; Liz Morgan³, DVM; Ingeborg M. Langohr², DMV, MS, PhD, DACVP. ¹Universidade Federal de Lavras (UFLA), Lavras, Brazil. ²Louisiana State University School of Veterinary Medicine, Department of Pathobiological Sciences and Louisiana Animal Disease Diagnostic Laboratory, Baton Rouge, LA 70803. ³Audubon Animal Hospital, St. Francisville, LA.

Diagnosis: Ovarian Adenocarcinoma with carcinomatosis and egg-yolk peritonitis.

Typical Microscopic Findings: The miliary, white to tan, firm nodules noted grossly throughout the serosal lining, including around the ovarian follicles, corresponded histologically to nodules of an infiltrative, non-encapsulated, poorly demarcated, multilobulated malignant epithelial neoplasm that multifocally disrupted and replaced the ovarian parenchyma (Figures 3-5). Neoplastic cells were cuboidal to polygonal with indistinct cell borders and moderate amount of finely granular eosinophilic cytoplasm. The nuclei, which tended to be at the basilar aspect of the cells, were round to oval, with coarsely stippled chromatin and a single nucleolus. Anisocytosis and anisokaryosis were moderate; mitotic figures were rare (<1/10 hpf). Foamy macrophages with golden or light brown cytoplasmic pigment (presumptive ceroid material) were occasionally noted in the ovarian cortex in association with atretic follicles. In addition, variable numbers of heterophils and macrophages were scattered throughout and along the surface of the ovarian stroma, associated with homogenous to globular bright eosinophilic (free yolk) material (Figure 6).

Neoplastic nodules were also present on the serosal surfaces of the proventriculus, ventriculus, small and large intestines, liver, mesentery, abdominal wall, and oviducts. Particularly within the intestine, these serosal implantation metastases were accompanied by vascular invasion in the muscularis externa.
Figure 3. H&E, subgross microphotograph.
Figure 4. H&E, 5x.

Figure 5. H&E, 5x.
Discussion: Birds kept as companion pet animals have often increased lifespan, which increases the incidence of several diseases associated with age, in particular degenerative and neoplastic processes. The most common neoplasms reported in birds affect the integument or urogenital system, including the ovary.3,4

Reported neoplasms of the female reproductive tract in birds involving the ovaries and oviducts include adenomas, adenocarcinomas, granulosa cell tumors, and hemangiosarcomas.6 Ovarian adenomas are rarely reported, whereas adenocarcinomas are frequent in older laying hens.1 Ovarian adenocarcinomas have previously been speculated to have an association with hormonal levels of estrogen or progesterone; however, no such correlation could be demonstrated.4 Clinical signs include persistent breeding behavior, egg retention, and coelomic distention secondary to ascites.5,6

Grossly, ovarian adenocarcinomas are characterized by variably sized, solid or pedunculated, pale tan-gray, nodular or multinodular masses.1,7 As the nodules coalesce, the neoplasm, which may resemble a cauliflower-like proliferation, eventually replaces the ovarian parenchyma.1,4 Affected ovaries may have only a single or a few tumor nodules throughout the normal parenchyma or be completely involved with no active follicles.2 Metastases can occur via the
hematogenous route, particularly to the lungs and less often to the liver and spleen. Implantation metastasis is also observed on the serosal surfaces of adjacent organs and mesentery. In more severe cases, numerous nodules are located throughout the coelomic cavity (carcinomatosis). Occasionally, cystic structures can be seen projecting from the surface of the ovary. Intestinal obstruction due to encircling and constricting the intestinal wall by the tumor can be seen as an additional effect. In this bird, the infiltrative neoplasm may also have caused rupture of ovarian follicles, leading to release of egg yolk material and consequently the concurrent peritonitis.

Microscopically in cases of ovarian adenocarcinomas, there is initial proliferation of poorly differentiated epithelial cells arranged in small acini and/or papillary projections, accompanied by abundant stromal proliferation (desmoplasia). Over time, neoplastic cells replace the ovarian stroma and invade the wall of the oviduct. Large tumors are transmural and protrude the serosal surface. Mitotic figures are rarely present. Adenocarcinomas in the ovary and oviduct are grossly and histologically difficult to differentiate. The location of the neoplasm is essential in the determination of its primary site, with oviductal carcinomas commonly seen in the magnum.

References:

*The Diagnostic Exercises are an initiative of the Latin Comparative Pathology Group (LCPG), the Latin American subdivision of The Davis-Thompson Foundation. These exercises are contributed by members and non-members from any country of residence. Consider submitting an exercise! A final document containing this material with answers and a brief discussion will be posted on the CL Davis website (http://www.cldavis.org/diagnostic_exercises.html).

Associate Editor for this Diagnostic Exercise: Ingeborg Langohr
Editor-in-chief: Vinicius Carreira