Retrobulbar teratoma in a great blue heron (Ardea herodias)

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At presentation to the Vermont Institute of Natural Science, an adult female great blue heron (Ardea herodias) had unilateral exophthalmos. The bird was subsequently euthanized and submitted to the Tufts University School of Veterinary Medicine Wildlife Clinic.

On postmortem examination, the shape of the right eye was distorted by a firm, discrete 5.0-cm-diameter retrobulbar mass (Fig. 1). Its cut surface was solid and cystic, gritty and mucoid, and mottled gray-white, pink, and yellow. The bony orbit and remaining viscera were grossly normal. For microscopic examination, 6-µm sections of formalin-fixed, paraffin-embedded samples of the retrobulbar mass, adrenal glands, and left ovary were stained with hematoxylin and eosin (HE), periodic acid-Schiff (PAS), and Gomori's methenamine silver.

Histopathologic examination of the retrobulbar mass revealed a circumscribed array of haphazardly distributed islands of mineralized woven bone, hyaline cartilage, fat, fibrous tissue, skeletal and smooth muscle, melanocytes, and various epithelia. PAS-positive, mucus-filled columnar epithelial cell-lined cysts (Fig. 2) with evidence of goblet cell differentiation and keratin-filled stratified squamous epithelial cell-lined cysts. There was a circumscribed array of haphazardly distributed islands of mineralized woven bone, hyaline cartilage, fat, fibrous tissue, skeletal and smooth muscle, melanocytes, and various epithelia. PAS-positive, mucus-filled columnar epithelial cell-lined cysts.
right oviduct, that were lined by a single layer of low cuboidal epithelial cells and a circumferential band of smooth muscle. There were no other significant microscopic findings.

In mammals and birds, teratomas occur principally in the gonads. In a study of 328 broiler chickens, however, 4 out of the 9 birds with teratomas had nongonadal (kidney, adrenal, pineal, and nervous system) sites of involvement. Teratomas in birds have also been reported to involve the oviduct and mesentery. In birds, teratomas are most commonly observed in chickens. In a study of 196 tumors in pet birds, no teratomas were reported. There are only a few reports of teratomatous lesions in free-living wild birds. Alleged to be a teratoma, a tumor characterized histologically by a uniform population of undifferentiated neoplastic cells and small feather follicles was reported in a black-headed gull (Larus ridibundus), with masses disseminated throughout the body. Composed histologically of lymphangiomatous, epithelial, fibrosarcomatous, and chondromatous areas, retrobulbar and pectoral masses in a Seychelles kestrel (Falco araea) were reported as a mixed cell tumor.

In domestic animals, teratomatous lesions occur rarely in midline sites such as the pineal, hypothalamus, and suprasellar area. The median or paramedian location of extra-gonadal teratomas is in accord with the migration of primordial germ cells in the embryo. In humans, extragonadal teratomas occur primarily in children and involve the sacrococcygeal region. Those that originate within the orbit are very uncommon.

Contemporary theories about the histogenesis of teratomas can be divided into 6 types, which propose that these tumors arise from 1) primordial germ cells, 2) nongerminal ("embryonic") cells of the early conceptus, 3) "stem cells," 4) extraembryonic cells, 5) "included" twins, or 6) different cell types depending on the anatomic site. The orbital location of this bird’s teratoma is consistent with the theory that it might have arisen from nests of primordial germ cells sequestered near the midline of the body during embryogenesis. Current evidence suggests that at least some teratomas are parthenogenetic tumors that develop from a single germ cell that has completed its first but not second meiotic division.

Teratomas in animals, in contrast to those in humans, are almost always benign. In humans, classification of a teratoma as benign or malignant is based largely on the identification of primitive, undifferentiated cells and tissues within.
the tumor. In general, the presence of a germ cell component worsens the prognosis, and teratomas with incompletely differentiated tissues should be considered potentially malignant.7

References