University of New Hampshire
New Hampshire Veterinary Diagnostic Laboratory
21 Botanical Lane
Durham, NH 03824-3590
Phone:(603) 862-2726
Fax:(603) 862-0179
www.nhvdl.unh.edu

Final Report

[redacted]
TUFTS WILDLIFE CLINIC
200 WESTBORO RD
NO GRAFTON , MA 01536

UNH Case#: [redacted]
Date Received: 02/27/15
Owner:
Case Id: [redacted]
Species: Bald Eagle

Pathology Report

Specimen:
Formalin fixed tissues are submitted from a ~ 6 month old female bald eagle (*Haliaeetus leucocephalus* [redacted]).

Histopathology:
Slides A – K: Tissue preservation is good.
Brain, 4 sections : Irregular areas of vacuolation are present in the cerebral gray matter. In these regions, neurons are frequently hypereosinophilic and angular with slight condensation or absence of the nuclei (neuronal necrosis). Glial cells (astrocytes) are often swollen with vesicular nuclei and these cells are rarely present in small clusters. Purkinje cells of the cerebellum are often necrotic with mild vacuolation of the surrounding neuropil.
Liver, 6 sections : Numerous large clusters of parasitic ova are present within cavitated spaces within all sections of the liver: ova have a thick yellow wall and opercula and contain larvae (miracidia). Adult trematodes occur frequently (occasionally within intact bile ducts) and are characterized by a solid body, paired cecae (containing dark pigment), vitellaria, a large thin walled uterus containing abundant ova, and a testis containing sperm. Hemorrhage, necrosis and granulomatous infiltrates often surround the eggs and flukes and/or small foci of necrosis containing small bacterial colonies. Dense aggregates of macrophages containing abundant granular brown pigment are present multifocally
Kidney, 3 sections : There is marked congestion of the interstitial vessels with scattered foci of hemorrhage; this is particularly marked within and surrounding the intralobular veins. Tubules in these regions often are lined by shrunken cells with pyknotic nuclei (autolysis or acute tubular necrosis).
Lung: There is moderate to marked congestion of the pulmonary vasculature with occasional hemorrhage into the parabronchi.
Pancreas: No significant histologic lesions are noted (NSL).
Proventriculus : Forming a raised dome-like lesion in the proventriculus are submucosa and mucosa fibrosis and deposits of eosinophilic material (fails to stain with Congo red) surrounded by granulomatous infiltrates. There are multifocal mild to moderate aggregates of lymphocytes, plasma cells, and heterophils in the mucosa. No organisms are detected in the lesions using special stains.
Heart: NSL
Esophagus: NSL
Skeletal muscle : NSL
Thyroid: NSL
Spleen: The spleen is congested and extramedullary hematopoiesis (EMH) is mild to moderate. Macrophages containing intracytoplasmic erythrocytes or pigment are often noted. Small fibrin deposits are present multifocally.
Small intestine, 4 sections: There is mild to moderate congestion of the vasculature. Trematode cross sections are occasionally noted in the lumen of the small intestine; there is little to no associated inflammation. A large metazoan parasite with a distinct body cavity is present on the slide: It has a thick cuticle and hypodermis, thick coelomyarian musculature and contains a prominent intestine lined by tall columnar cells with a brush border, abundant gonad, and a large uterus and numerous mamillated eggs.
Ovary and oviduct : NSL

Comment:
Tissue preservation is good with very little autolysis. Significant lesions are identified in the liver and brain. Hepatic trematodiasis was marked in this case with coalescing areas of hemorrhage, necrosis and granulomatous inflammation replacing much of the parenchyma. Bacterial colonies were also present in areas of hepatic necrosis and likely represent opportunistic invaders.
In the brain, there is acute neuronal necrosis and vacuolation of the associated grey matter of the cerebrum and cerebellum. No inflammation accompanies this change, suggesting the possibility of a metabolic or toxic cause. While nonspecific, lead toxicity is a potential cause of these lesions. Possible acute tubular necrosis is also present, however appears to be secondary to hemorrhage within the interstitium of the kidney and no inclusion bodies were detected. I would be interested in knowing if tissues/serum were tested for lead in this case. Given the severity of the liver lesions, I considered the possibility of hepatic encephalopathy; this condition however is poorly described in avian species. I also considered other possible causes, such as avian vacuolar myelopathy and bromethalin toxicity, however lesions associated with these conditions are restricted to the white matter (demyelination) which was not apparent in this case.
Extramedullary hematopoiesis and erythrophagocytosis were prominent in the spleen and suggest increased turnover/destruction of erythrocytes. Small fibrin deposits in the splenic vascular spaces suggest the possibility of terminal sepsis or DIC in this eagle.
Present in the intestine were occasional flukes and several large round worms measuring ~ 1.5 – 2 mm in cross section and 4 – 7 cm in

length. Morphologically, these appear to represent ascarids. Ascarids are common in birds of prey and include the genera *Ascaridia*, *Porrocaecum*, and *Contracaecum*. Small numbers of these worms are not usually pathogenic, but in large numbers unthriftiness, weight loss and intestinal obstruction can occur.

Diagnosis:

1. Hepatic trematodiasis (liver flukes), severe, subacute, with multifocal to coalescing hepatic necrosis, hemorrhage and granulomas and intralesional bacterial colonies
2. Neuronal necrosis and grey matter vacuolation, multifocal (cerebrum and cerebellum), acute, mild
3. Proventriculitis, granulomatous, chronic, moderate, with fibrosis
4. Renal interstitial congestion and hemorrhage with possible multifocal acute renal tubular necrosis
5. Splenic extramedullary hematopoiesis and erythrophagocytosis, moderate
6. Splenic intravascular fibrin deposits, multifocal, acute
7. Intestinal endoparasitism (flukes and round worms)

[redacted]

[redacted]

Report Generated: 01/29/19
Results Last Modified: 03/10/15