

## **MAVP Case 20**

### **Case History**

**Case #:** NC-24-0001404

**Presenter(s) & Institution:**

**Kelsey A. Brakel, Cory M. Howard**

**Michigan State University, Veterinary Diagnostic Laboratory, Lansing, MI**

**Signalment:**

11-day-old golden retriever puppy

**Clinical History:**

This puppy was in respiratory distress, and a diffuse alveolar pattern was identified on thoracic radiographs.

**Gross Findings/Hematological Findings:**

The kidneys were bilaterally mottled dark red to tan, and this discoloration extended from the capsular surface into the renal parenchyma. The liver was also mottled tan to red and the capsular surface was slightly irregular. The lungs were diffusely dark red, heavy, wet, and sank in formalin.



## **MAVP Case 19**

### **Case Synopsis**

**Case #: NC-24-0001404**

#### **Presenter(s) & Institution:**

**Kelsey A. Brakel, Cory M. Howard**

**Michigan State University, Veterinary Diagnostic Laboratory, Lansing, MI**

#### **Signalment:**

11-day-old golden retriever puppy

#### **Histopathology/Cytologic Findings:**

Two sections of eye are examined histologically. Within the retina, there is multifocal karyorrhectic debris in the nerve fiber layer, inner plexiform layer, and inner nuclear layer. The outer plexiform layer is multifocally indistinct. There is multifocal necrosis of retinal ganglion cells, characterized by hypereosinophilia and loss of nuclear detail. In other regions, there is complete absence of retinal ganglion cells, while others undergo central chromatolysis. Multifocally there are small aggregates of lymphocytes, plasma cells, and rare neutrophils surrounding blood vessels in the nerve fiber and ganglion cell layers. Peripherally, retinal layers are disorganized, and there are rare rosettes and frequent retinal folds. The lens is surrounded by a fine capillary network, consistent with tunica vasculosa lentis. The ciliary cleft and trabecular meshwork are incompletely formed, and there are small numbers of lymphocytes and neutrophils in this region. There is a lack of melanocytes on the anterior surface of the iris, consistent with a blue eye.

#### **Morphologic Diagnosis and Etiology:**

Eye:

Multifocal retinal necrosis

Focal retinal dysplasia

Mild lymphocytic anterior uveitis

#### **Results of Diagnostic/Confirmatory Testing:**

Kidney, canine herpesvirus-1 PCR: Positive

Kidney, aerobic culture: No bacterial growth

#### **Comments:**

Canid alphaherpesvirus-1 (CHV-1) infection was confirmed in this case via PCR of the kidney. Additional gross findings included petechiae and ecchymoses in the kidneys and liver, as well as more extensive hemorrhage and edema in the lungs. Histologically, there was extensive necrosis in the lungs, liver, and kidneys, with eosinophilic intranuclear viral inclusions identified in the renal tubular epithelial cells as well as in syncytial cells in the lungs. These gross and histologic findings are classic for CHV-1 infection in young puppies, who are typically infected at 1-3 weeks of age due to their inability to adequately thermoregulate combined with CHV-1's tropism for low body temperature. Systemic, cell-associated

viremia then ensues. Ocular disease is often present, but gross changes are rarely visible at the time of necropsy, and as a result eyes may be less likely to be sampled for histologic evaluation.

Experimental infection with CHV-1 in newborn beagle puppies showed pathologic changes similar to this case, including uveitis, retinal dysplasia, and retinal necrosis.<sup>1</sup> Other findings in this study which were not present in this case, likely due to the relatively short time interval between infection and death, were peripheral anterior synechia, cataract, keratitis, ectopic retina in the optic nerve, and changes to the retinal pigment epithelium.<sup>1</sup> Canine eyes are incompletely developed at birth, with an immature retina, immature drainage apparatus, and closed palpebral fissures. As a result, dogs that survive infection are likely to develop retinal dysplasia and blindness due to necrosis and reorganization of the developing retina. Natural infection in older dogs is less severe and can result in mild or recurrent keratitis and conjunctivitis.<sup>2</sup>

#### **References:**

1. Albert DM, Lahav M, Carmichael LE, Percy DH. Canine herpes-induced retinal dysplasia and associated ocular anomalies. *Invest Ophthalmol Vis Sci.* 1976;**15**(4):267–278.
2. Evermann JF, Ledbetter EC, Maes RK. Canine Reproductive, Respiratory, and Ocular Diseases due to Canine Herpesvirus. *Vet Clin North Am Small Anim Pract.* 2011;**41**(6):1097.