Canine Distemper

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Signalment

- Heeler cross
- Intact female
- 12-week-old
- 4.5-kg
Clinical History

- Patient seen on an ambulatory call - Primary complaint of lethargy, depression and failure to thrive for approximately 7 days

- Hematology, CBC, fecal floatation and Distemper Antigen IFA blood smear performed
Clinical Diagnostic Workup

- Physical exam
  - Initially alert and responsive, later becoming depressed
  - Serous oculonasal discharge

- Hematology / CBC
  - Non-specific abnormalities

- Distemper IFA blood smear
  - negative
Clinical Diagnostic Workup

- Dog appeared to be recovering, however re-presented to TUSVM clinic soon after
  - Green to yellow mucopurulent nasal discharge
  - Antibiotic treatment continued

- Four days later
  - Sporadic sneeze / cough
  - Ataxic / unable to stand or support weight voluntarily
  - Paddling
  - Muscle fasciculation
  - Alert, attentive, eating/drinking normal
Necropsy Examination

- Yellow, serous discharge draining from the nares and surrounding right eye
- Sticky subcutaneous tissue (dehydration)
- Lungs – diffusely mottled red to creamy pale brown, with multiple firm, white areas
Lungs *in situ*
Microscopic Findings

- **Lungs:**
  - Locally extensive severe inflammation within numerous bronchioles and extending through the walls into the interstitium (neutrophils and macrophages with lesser plasma cells)
  - Rare syncytial giant cells
  - Moderately thickened alveolar septa
  - Several expanded and ruptured alveoli

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Microscopic Findings

• Brain:
  • Cerebellar white matter
    • multifocal loss of neurofibrillary architecture (demyelination and necrosis)
      • Abundant astrocytes
        • within several astrocytes - refractive, eosinophilic, 3-5 micron diameter, intranuclear inclusion bodies which peripherally displace nuclear chromatin
      • Enlarges astrocytes → “Gemistocyte” formation
    • Abundant microglia cells
Cerebellum (60X-hpf)
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Morphological Diagnoses

- **Cerebellum:** Demyelination and necrosis, multifocal, severe, with astroglisis, intralesional eosinophilic intranuclear inclusion bodies and neuronal degeneration

- **Lung:** Pneumonia, bronchointerstitial, severe, locally extensive, chronic active, with syncytial giant cells
Canine Distemper

- Clinical signs, gross and microscopic lesions highly consistent with Canine Distemper (morbilivirus) infection
Canine Distemper

- Enveloped, single stranded RNA morbillivirus in the Paramyxoviridae
- 50-70% of infections are subclinical
- Typical clinical findings:
  - Depression
  - Biphasic fever
  - Serous to mucopurulent oculonasal discharge
  - Coughing
  - Hyperkeratosis of planum nasale and footpads (hard pad disease)
  - Occasionally blindness and retinal degeneration
  - CNS signs including seizures, myoclonus, cerebellar or vestibular ataxia, paresis, hyperesthesia and rigidity
Canine Distemper

- Pathogenesis
  - Transmission via inhalation
  - Initial replication within respiratory lymphatic tissue, respiratory epithelium and alveolar macrophages
  - 2-5 days post exposure: Primary infection of tonsils and local lymph nodes
  - 4-6 days after primary spread: Hematogenous circulation → infection of other tissues such as urinary bladder, stomach and brain
  - Lymphoid depletion suppresses immunity and predisposes to secondary infection
Canine Distemper

- 1-3 weeks after systemic signs: CNS signs develop
  - affinity for myelinated portions of the brain and spinal cord
  - Characteristic loss of neurofibrillary architecture (status spongiosa)
    - Increased microglia cells and astrocytes
    - Occasionally perivascular lymphocytes
  - Gemistocytic astrocytes ("gemistocytes") containing eosinophilic intranuclear inclusion bodies
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