EASTERN EQUINE ENCEPHALITIS
VIRUS & EPIZOOTIC HEMORRHAGIC
DISEASE VIRUS IN A WHITE-TAILED
DEER FAWN (N14-332)

Ember Epperson, DVM
Serena L. M. Craft, DVM, Diplomate ACVP
SIGNALMENT AND HISTORY

2 week old male white-tailed deer
(Odocoileus virginianus)

- Euthanized June 24th
  - 1 day history of nystagmus, blindness, inability to rise, severe dehydration, hematochezia, and maggot infestation of rectum

- Central Florida cervid farm
  - Sudden death of 7 fawns (2 to 3 weeks old) in the past week
    - Obtunded, pyrexic, and anorexic
  - 7 year old doe also died suddenly
    - Pyrexic, blind, painful (bruxism), ataxic, and quadriparetic

- >50% of the farm very flooded with standing water
GROSS FINDINGS

• Live fleas & ticks
• Open wound over left ilial wing which extended into fascial planes with live fly larvae
• Lower lip → 1 x 0.2 cm linear ulceration
• Nasal planum → 1.2 x 0.5 cm and 1.8 x 0.3 cm erosions
GROSS FINDINGS

• Live fleas & ticks
• Open wound over left ilial wing which extended into fascial planes with live fly larvae
• Lower lip $\rightarrow$ 1 x 0.2 cm linear ulceration
• Nasal planum $\rightarrow$ 1.2 x 0.5 cm and 1.8 x 0.3 cm erosions
MICROSCOPIC FINDINGS
NASAL PLANUM & LOWER LIP
NASAL PLANUM & LOWER LIP
NASAL PLANUM & LOWER LIP
MORPHOLOGIC DIAGNOSES

• **Meningoencephalitis**, perivascular, lymphoplasmacytic, neutrophilic, subacute, multifocal, moderate to marked, with multifocal neuronal necrosis, gliosis, vasculitis, reactive astrocytosis, & mild edema

• **Dermatitis & cheilitis**, ulcerative, lymphohistiocytic, neutrophilic, subacute, multifocal, moderate to marked, with mild hemorrhage, furunculosis, folliculitis, sebaceous and seroglandular adenitis, hidradenitis, mild lymphoplasmacytic vasculitis, & thrombosis, nasal planum & lower lip
ADDITIONAL DIAGNOSTICS

• **Brain** (frontal cortex) ➔ State of Florida, Bureau of Public Health Laboratories
  – *Positive by PCR for Eastern equine encephalitis virus*

• **Spleen** ➔ National Veterinary Services Laboratories
  – *Positive by reverse transcriptase-PCR for Epizootic hemorrhagic disease virus RNA, serotype 6*
  – *Negative for Bluetongue virus*

Permission granted only for viewing on SEVPAC website
EASTERN EQUINE ENCEPHALITIS VIRUS

EEEV: genus Alphavirus, family Togaviridae

• Seasonal occurrence
  – Late summer, early fall
• Maintained via enzootic cycle with Culiseta melanura mosquitoes & wild avian hosts
• Bridge vectors → Culex, Aedes, Coquillettidia spp.
  – EEEV transmission to “dead-end” hosts: horses, humans, white-tailed deer, dogs, camelids, swine, cattle, fish, turtles, snakes
EASTERN EQUINE ENCEPHALITIS VIRUS

**Pathogenesis**

- **Inoculation** → initial viremia infects muscle, connective tissue, lymphoid tissue, bone marrow
- **Second viremia** → hematogenous CNS infection potentially following replication in endothelial cells
- **Viral neurotropism** → polioencephalomyelitis & meningitis

- **No pathognomonic gross lesions**

- **Clinical signs**
  - Subclinical, fever, mild depression
  - Neurologic signs following 1 – 3 week incubation period
EPIZOOTIC HEMORRHAGIC DISEASE VIRUS

EHDV: genus Orbivirus, family Reoviridae

• Noncontagious hemorrhagic disease of wild and domestic ruminants

• Clinicopathologically indistinguishable from Bluetongue virus (BTV)

• Seasonal occurrence
  – Late summer, early fall
  – Transmission via biting midges in genus Culicoides
  – Drought, high temperatures

• Serotypes 1 & 2 enzootic in US
  – Serotype 6: Florida, Indiana, Iowa, Michigan, Missouri
EPIZOOTIC HEMORRHAGIC DISEASE VIRUS

Three forms of disease:

• **Peracute**
  - High fever, lethargy, edema of head, tongue, eyelids, lungs

• **Acute** = “classic hemorrhagic” form
  - Erosions/ulcerations of dental pad and oral mucosa
  - Hemorrhages or congestion of heart, pulmonary artery, oral mucosa, rumen, abomasum, intestines

• **Chronic**
  - Severe oral ulcerations, papillae loss, ruminal mucosal scarring
  - Coronitis → growth interruptions, sloughing of hoof wall with clinical lameness

Permission granted only for viewing on SEVPAC website

Photographs from Noah’s Arkive, University of Georgia
Pathogenesis

- Culicoides sp. bite ➔ primary viral replication in lymph nodes & spleen within monocytes and lymphocytes
- Viremia ➔ infection of erythrocytes & endothelial cells
- Endothelial damage ➔ hemorrhage, edema, thrombosis, ischemic necrosis
THANK YOU!

- Serena Craft, DVM, DACVP
- UF Histology lab
- Patrick Knisley
- Fellow residents

References


Permission granted only for viewing on SEVPAC website