The Befuddled Beagle

Emma Gordon
“Zena”

• Estimated 1-2 year-old intact female Beagle mix
• Rescued from a ditch and taken to an animal shelter
  • Severe emaciation and muscle wasting
  • Heartworm negative
• Neurologic signs (5 day duration)
  • 2 seizures
  • Generalized, progressive ataxia
  • Falling to the left
  • Stargazing
  • Hypersalivation
  • Head pressing

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Clinical History

- In transit to LSU
  - 2 Generalized & 2 focal seizures
  - Hyper-responsive to stimuli
  - Non ambulatory
- Blood work performed was consistent with malnutrition
- Hospitalized with supportive care
- Radiographs unremarkable
  - Incidental metal BB at T3/T4
- MRI performed
Brain MRI
T2
Brain MRI
SAG T2

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Neurologic Progression

- Focal seizures
  - On anticonvulsant therapy
- Mental depression
- Respiratory arrest
  - Humane euthanasia elected
L1612780 Beagle mix; Cerebrum H&E
L1612780 Beagle mix; Cerebrum Luxol Fast Blue/PAS
L1612780 Beagle mix; Cerebellum/Brainstem Luxol Fast Blue/PAS

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**Ancillary Testing**

- Fluorescent antibody testing
  - Canine distemper – negative
  - Rabies virus – negative
- Referral (Dr. G. Diane Shelton, UC San Diego)
  - Peroneal nerve – no abnormalities evident
  - Dorsal root ganglion (C3) – large & small vacuoles present
Brain, Severe leukoencephalopathy
Differential Diagnoses

- **Toxicosis** *(Bromethalin, Trialkyltin, hexachlorophene, isoniazid, Cuprizone)*
- Inherited spongiform leukodystrophies
  - Globoid Cell leukodystrophy
  - Metachromatic leukodystrophy
  - Spongiform leukoencephalomyelopathy
- Osmotic demyelination syndrome
- Hypothyroidism
Bromethalin Toxicosis

- Most common toxicosis associated with severe myelin swelling & degeneration
- Strong uncoupler of oxidative phosphorylation
  - Intra-myelin fluid accumulation, long nerve demyelination, & intra-myelin cerebral edema
  - Cerebral & spinal edema = increased CSF pressure = neurologic dysfunction
  - Young dogs are more sensitive
- Clinical signs may take up to 7 days to develop
  - Dose dependent
  - No antemortem test to date
- Rapidly degraded by UV light
- Metabolized within hours
- Plasma half life of 6 days (rats)
In Summary

- Severe leukoencephalopathy
  - Severe, diffuse spongiosis of the white matter
    - Cerebrum (most affected), Cerebellum, and brainstem
  - Grey matter unaffected
- Etiology undetermined
  - Bromethalin toxicosis suspected
  - Stray status
  - Ancillary testing ruled out viral causes
  - Inherited causes cannot be ruled out
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