**Classic case:** Unilateral **gluteal muscle atrophy** but not **lame**

Weeks later: progressive **hemiparesis, ataxia, Horner syndrome**, unilateral masseter or temporalis atrophy

**Presentation:**

History and signalment

- **Two age groups** predominate
  - 1–5 years
  - Over 13 years
- **Risk factors**
  - Heavy exercise, warmer seasons
  - Breeding, transportation
  - High stocking densities
  - **Environmental change**
  - **Opossum feces in feed**

**Clinical signs**

- **Unilateral/asymmetrical [gluteal] muscle atrophy**
- **Weeks later:** Broad spectrum CNS signs
  - Typically see **multifocal, asymmetric cranial nerve** involvement
  - Mild lameness, ataxia, head tilt
  - Progressive **hemiparesis, Horner’s, unilateral masseter, temporalis atrophy**, Somnolence, seizures, recumbency
- **Acute** or chronic; progressive but may wax and wane
- May be subclinical

**DDX:** Any equine neurologic disease that affects CNS

EHV-1, cervical vertebral malformation, vertebral osteomyelitis, equine degenerative myeloencephalopathy, rabies, botulism, tetanus, *Sorghum* intoxication, lathyrism, stringhalt, fibrotic myopathy, polyneuritis equi, peripheral nerve trauma, EEE, WEE, VEE, WNV, moldy corn poisoning, hepatoencephalopathy, head or vertebral trauma, verminous migration

**Test(s) of choice:** NO definitive antemortem test - rule out other diseases from differential list

- Radiography of skull, vertebral column, limbs - normal
- Bloodwork: CBC, serum chemistries - normal
- **Serologic testing:** Indirect fluorescent antibody test (**IFAT**) or **SAG-2, 4/3 ELISA** : *S neurona* antibody presence in serum only indicates exposure,
  - If **negative**, EPM is **highly unlikely** unless very acute
  - Western blot test has fallen out of favor because less quantitative results
- **CSF is usually normal**
  - Can show a nonsuppurative inflammatory response
  - PCR for *S neurona* specific DNA is only positive in a small percentage of cases
- Highest accuracy/gold standard is: **Ratio of antibody in serum to CSF**; reveals intrathecal production of antibodies in most cases
  - Use IFAT —or— SAG-2, 4/3 for these ratios

**Opossum, Didelphis virginiana:** **Definitive host** for *Sarcocystis neurona*

*Image courtesy, Cody Pope*
Equine protozoal myeloencephalitis (EPM)

Rx of choice:
Anticoccidials (3 FDA-approved options):
• Benzeneacetonitriles: given for 1–2 months; very safe
  • Ponazuril
  • Diclazuril
• Folate-inhibitors: sulfadiazine/pyrimethamine combo
  • Must be given for up to 6 months!
  • Keep horses on good quality, unprocessed green forage rich in folate
  • Folate-deficiency leads to anemia; can be teratogenic in fetus
  • Monitor CBC
Anti-inflammatory drugs in severe cases
• Flunixin meglumine
• DMSO
• Dexamethasone
• Vitamin E

Prognosis:
• Fair to good (60%) for Improvement: typically improve 1–2 (out of 5) grades, depending on chronicity
  • Guarded to poor (10-20%) for cure
  • Can have repeated cases in same horse

Prevention:
• Opossum control: Keep feed, fruit, and garbage well contained
  • Minimize stress

Sarcocysts in muscle tissue, stained with hematoxylin and eosin (H&E).
Image courtesy, DPDx, CDC
Equine protozoal myeloencephalitis (EPM)

Pearls:

- Mostly *Sarcocystis neurona*, however there are increasing reports of *Neospora hughesi*
- **Most common equine CNS inflammatory disease**
  - Many horses are infected but only few have the disease
  - Cannot be passed between horses
  - Horse infected from feed contaminated with opossum feces

Life cycle of *S. neurona* - key points

- **Definitive host – opossum**
  - Eats sarcocyst-infected tissue from an intermediate host
  - Sexual reproduction in host’s small intestine
  - Oocysts (containing two sporocysts) are passed in feces
  - Each sporocyst contains four sporozoites

- **Intermediate hosts**
  - Skunk, raccoon, armadillo (otter, cat)
  - Ingests sporozoites
  - Sporozoites invade small intestine
  - Asexually produce merozoites which enter bloodstream
  - Form sarcocysts in skeletal muscle
Equine protozoal myeloencephalitis (EPM)


A. Cross section of spinal cord with focal areas of necrosis
B and C. Section of spinal cord of horse with EPM.
The dots are merozoites.
Images courtesy, USDA
Equine protozoal myeloencephalitis (EPM)

Sarcocystis neurona life cycle:
Note gluteal atrophy, masticatory muscle atrophy (yellow circle) Table courtesy, USDA