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# Equine Protozoal Myelitis (EPM)

Extended Version

**Classic case:** **Unilateral gluteal muscle atrophy** but **not lame**
Weeks later: progressive **hemiparesis, ataxia, Horner's**, unilateral masseter, 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**

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

*Image courtesy, Cody Pope*

Clinical signs

- **Unilateral 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**: **Western blot**: *S neurona* antibody presence in serum only indicates exposure, but **if negative, EPM is highly unlikely**
- Toxicity testing – negative
- Electromyography – helps to localize lesions but not diagnostic
- **CSF is usually normal**
  - Can show a nonsuppurative inflammatory response
  - **Western blot**: ***S neurona* antibody presence** **in CSF** is suggestive of EPM, but can be false positive because of blood/serum contamination
  - PCR for *S neurona* specific DNA is only positive in a small percentage of cases

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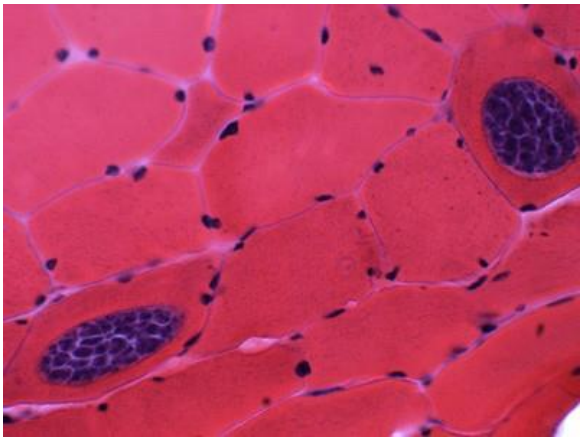
## Rx of choice:

Antibiotics

- Folate-inhibitors
  - Keep horses on good quality, unprocessed green forage rich in folate
  - Monitor CBC
- Triazineones
- Nitrothiazoles

Anti-inflammatory drugs for up to 5 days in severe cases

- Phenylbutazone
- DMSO
- Dexamethasone



*Sarcocysts in muscle tissue, stained with hematoxylin and eosin (H&E).*

*Image courtesy, DPDx, CDC*

## Prognosis:

**Fair to good** (60%) **for improvement**

**Guarded to poor** (10-20%) **for cure**

## Prevention:

- Adjuvant-based vaccine made from killed *S neurona* cultured merozoites
- **Opossum control**
- Keep feed, fruit, and garbage well contained

## Pearls:

- Mostly *Sarcocystis neurona*, however there are few reports of *Neospora* spp

- 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

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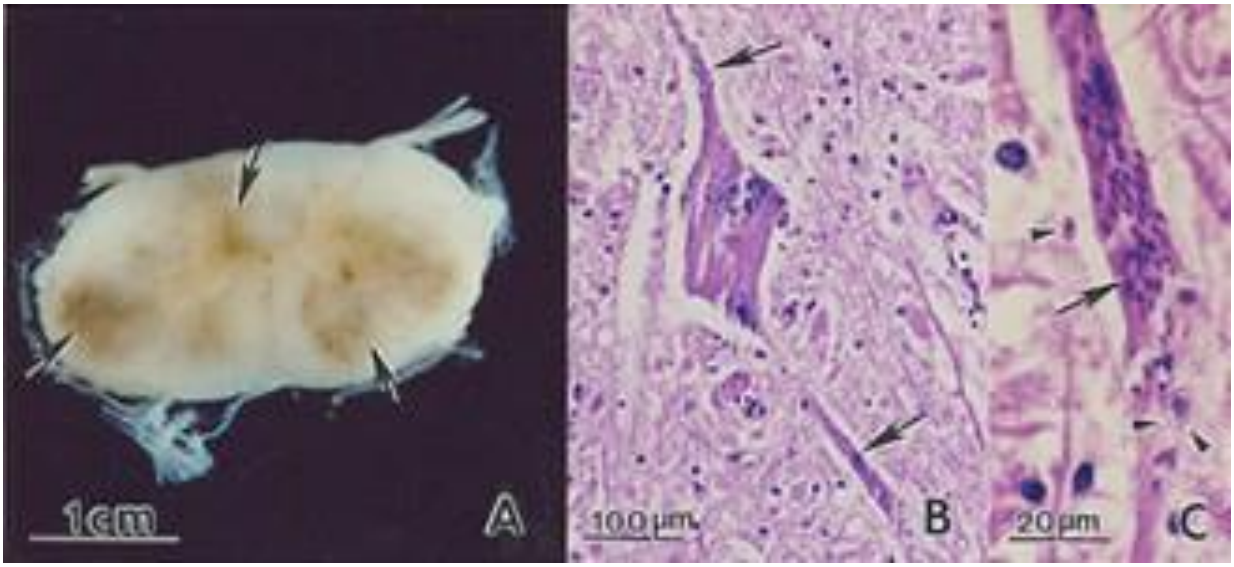
**Refs:** Veterinary Neuroanatomy and Clinical Neurology, de Lahunta and Glass, 3rd ed. p 164,295-301,341-342, Large Animal Neurology, Mayhew, 2nd ed. pp. 260-67, Dubey, J.P., et al, 2001 . A review of *Sarcocystis neurona* and equine protozoal myeloencephalitis (EPM). Vet. Parasitol., 95: 89-131 and Merck Manual, 10th ed (online): Equine Protozoal Myeloencephalitis




*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*

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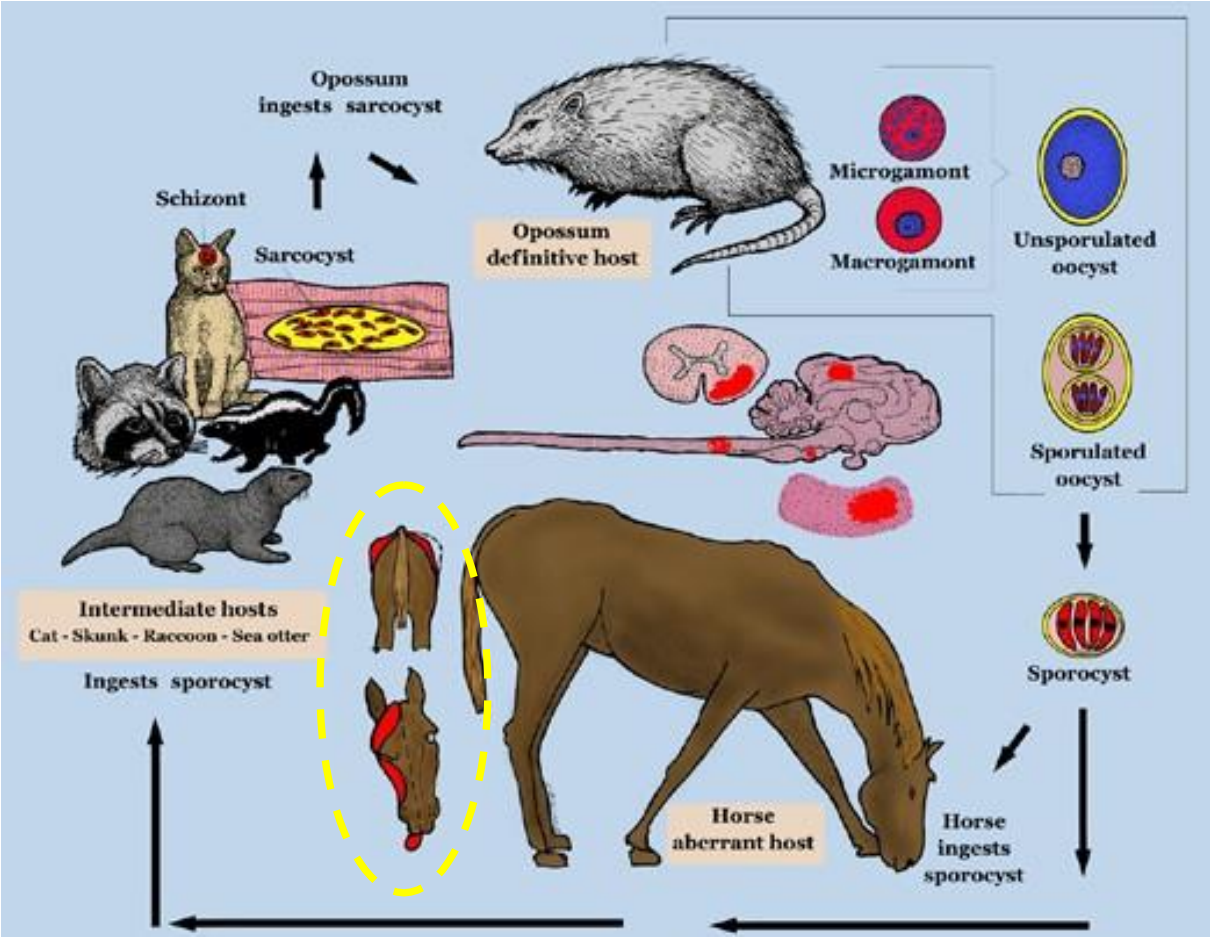


*Sarcocystis neurona life cycle:*
*Note gluteal atrophy, masticatory muscle atrophy (yellow circle) Table courtesy, USDA*

**My Notes:**