Toxicities Causing

Muscle Weakness or Paralysis

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Muscle Weakness and Paralysis

PROBLEMS:

- Ataxia
- Muscle weakness
- Collapse
- Posterior Paralysis
- Ascending Paralysis

Muscle Weakness and Paralysis

Differential diagnoses:

- Botulism
- Chlorinated Phenoxy Herbicides
- Ionophores
- Organophosphates (OPIDN)
- Paralytic Shellfish poisoning
- Karaka (Cornynocarpus laevigatus poisonous plant)

Muscle Weakness and Paralysis

IONOPHORES - SOURCES

- lasalocid
- salinomycin
- narasin
- monensin

Toxic dose ranges from 1-2 mg/kg horse to 20 mg/kg dog

Muscle Weakness and Paralysis

IONOPHORES – Mechanism

- Potassium transport regulation
  - Decreased cellular energy production
- Mitochondrial damage
  - sodium – calcium exchange

Muscle Weakness and Paralysis

IONOPHORES – Effects

- Skeletal muscle necrosis
  - Dogs
- Cardiac muscle necrosis
  - cattle, horse, cats

Muscle Weakness and Paralysis

IONOPHORES – eg Monensin

- Depression, anorexia
- Ascending incoordination
- Muscle weakness
- Recumbency

Muscle Weakness and Paralysis

IONOPHORES

- Loss of reflexes
- Paresis, Paralysis
- Muscle necrosis
- Dyspnoea, apnoea

Muscle Weakness and Paralysis

IONOPHORES

Clinical Pathology

- Muscle enzymes indicate necrosis
- Liver enzymes increase
- May see changes indicative of dehydration (elevated haematocrit)

Muscle Weakness and Paralysis

IONOPHORES

Postmortem

- Few postmortem changes
- Cardiac – mild necrosis, if any
- Cattle develop cardiac muscle fibrosis

Muscle Weakness and Paralysis

IONOPHORE TREATMENT

- General supportive care
  - Nutritional support
    - Vitamin E and selenium protective
  - Respiratory support
- Long term care

Muscle Weakness and Paralysis

HERBICIDES: MCPA, 2,4-D

Species Susceptibility

- Dogs most sensitive 100 mg/kg toxic
- Swine 100mg/kg
- Cattle 200 mg/kg
- Horses and other species

Toxicities Causing Muscle Weakness and Paralysis

HERBICIDES: MCPA, 2,4-D

- Rapidly absorbed in acid pH
- Dermal-slow and incomplete
- Metabolism-minor
- Excretion as an acid in urine

Toxicities Causing Muscle Weakness and Paralysis

HERBICIDES: MCPA, 2,4-D

Mechanism of Action:

Uncoupling of oxidative phosphorylation

Toxicities Causing Muscle Weakness and Paralysis

HERBICIDES: MCPA, 2,4-D

- Muscle rigidity (myotonia) & weakness
- Spastic movements
- Opisthotonos
- Periodic clonic spasms
- Rigor mortis – fast onset

Toxicities Causing Muscle Weakness and Paralysis

HERBICIDES

- Clinical Pathology
  - muscle necrosis (↑ creatine kinase)
  - Alkaline Phosphatase ↑
  - Liver enzymes increased (↑ ALT)
  - Urea ↑ (blood urea nitrogen)

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HERBICIDE TREATMENT

- Forced alkaline diuresis
- Symptomatic and supportive care
  - Acidic effects on GIT
- Decontaminate!

Muscle Weakness and Paralysis

ORGANOPHOSPHATE DELAYED NEUROPATHY

See ANS toxicities

- Sensory and motor peripheral neuropathy
- Proprioception
- Posterior paralysis

Muscle Weakness and Paralysis

ORGANOPHOSPHATE DELAYED NEUROPATHY

- No effective treatment
- Supportive care
- Mild cases, very slow recovery

Muscle Weakness and Paralysis

SUMMARY

- History of exposure
- Muscle necrosis (+ or -)
- Clinical pathology (muscle enzymes)
- Analytical tests (id compound)
- Supportive care