Respiratory Toxicities

Respiratory Toxicities

Problems

- Dyspnoea, lethargy, weakness
- Coughing, pallor, anorexia
- Vomiting
- Mucous membranes
  - Pale, Red or Brown

Respiratory Toxicities

Differential diagnoses:

- Nitrites, Onions, Paracetamol
  - Methaemoglobinaemia
- Cyanide
  - cytochrome oxidase complex
- Carbon monoxide (CO)
  - Carboxyhaemoglobin

Respiratory Toxicities

Differential diagnoses:

- Anticoagulant Rodenticides
- Paraquat
- Selenium
- Zinc Phosphide (Mg & Al phosphide)

Respiratory Toxicities

Differential diagnoses:

- Copper
- Teflon pans (birds)
- L-tryptophan (fog fever)
- Goats rue (*Galega officinalis*)

Respiratory Toxicities
NITRATES/NITRITE

Sources:

- Pasture plants
  - weather & fertiliser affects nitrate levels
- Crops (Brassicas, oats …)
- Weeds (especially herbicide treated)
- Water
- Fertilisers
- Dog rolls - nitrite

Respiratory Toxicities
NITRATES/NITRITE

Mechanism of Action:

- Rumen microbes convert nitrate to nitrite
- Nitrite oxidises haemoglobin to methaemoglobin
  - brown blood
- Methaemoglobin reductase has a limited capacity to detoxify

Respiratory Toxicities
NITRATES/NITRITE

Clinical Signs:

- Respiratory Effects
  - Dyspnoea and cyanosis (brown blood)
- Gastrointestinal Effects
  - Irritation to GI tract – Salivation, pain
- Central Nervous System Effects
  - Ataxia, tremors, convulsions
- Vasodilation (contributes to tissue anoxia)

Respiratory Toxicities
NITRATES/NITRITE

Diagnosis:

- History (pasture, crop, weather)
- Clinical Signs (brown blood, sudden death)
- Diphenylamine test on plants
  - aqueous humour up to 60 hours PM
- Plant Samples to laboratory to quantify

Respiratory Toxicities
NITRATES/NITRITE

Treatment:

- Do NOT stress the animals
- Provide safe feed (hay or pasture)
- Methylene blue
  - converts methaemoglobin back to oxyhaemoglobin
  - Issues – long withholding time

Respiratory Toxicities
PARAQUAT

- Sources – Herbicide usage
- Toxicity
  - dog 25-50 mg/kg
  - diquat is 100-200 mg/kg
- Pathogenesis
  - irritant orally or dermally
  - accumulates in the lungs
  - fibrosis due to superoxide radicals that induce lipid peroxidation

Respiratory Toxicities
PARAQUAT

- Absorption – poor 20%
- Lung concentrates
  - alveolar cells 10X levels
- Excreted in urine
  - generally unchanged
  - after 24-48 hours not detectable

Respiratory Toxicities

PARAQUAT – Clinical Effects

- Oral lesions-irritation, blisters
- 3 phases in acute poisoning
- 1) Caustic action
  - Vomiting
  - Abdominal pain
- 2) Renal injury + hepatocellular necrosis by 2nd or 3rd day
- 3) Pulmonary Fibrosis
  - poor prognosis

Respiratory Toxicities

PARAQUAT – Diagnosis

- History of exposure
- Collect urine within 24 hours of exposure
- Plasma levels up to 30 hours
- Lung levels detectable 4 days

Respiratory Toxicities

PARAQUAT TREATMENT

- Early decontamination
  Repeat Activated Charcoal
- Fluid therapy (diuresis)
- captopril ? within 1 hour
- DO NOT give Oxygen!
- Anti-oxidants Vit E, C
- N-Acetyl cysteine
  (Parvolex)

Respiratory Toxicities

SUMMARY

- Early decontamination
- Nitrate/nitrite
  - Methylene blue
- Paraquat
  - NAC, Anti-oxidant therapy?