

Gastrointestinal and Hepatic Toxicities

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Gastrointestinal Toxicities

PROBLEMS:

- Vomiting
- Abdominal pain
- Anorexia
- Salivation
- \pm Diarrhoea

Gastrointestinal Toxicities

Differential diagnoses:

- Metals: arsenic, copper, lead, zinc
- Cholecalciferol
- Fertiliser
- Garbage ingestion

Gastrointestinal Toxicities

Differential diagnoses:

- Organophosphates and carbamates
- NSAIDs
- Paracetamol
- Phosphorised pesticides

Gastrointestinal Toxicities

ARSENIC SOURCES

- Pesticides
- Peltex treatment of pelts
- Dips and orchard sprays
- Arsanilic acid (feed additive)



Sodium arsenite

Gastrointestinal Toxicities

ARSENIC SOURCES

- Tanalised wood



Gastrointestinal Toxicities

ARSENIC-ORAL

- Intense abdominal pain
- Thirsty
- Salivation
- Vomiting
- Staggering gait

Gastrointestinal Toxicities

ARSENIC-ORAL

- Weakness
- Diarrhoea
- Prostration
- Hypothermia

Gastrointestinal Toxicities

ARSENILIC ACID - PIGS

- Ataxia
- incoordination
- torticollis
- blindness
- sitting dog stance

Gastrointestinal Toxicities

ARSENIC-DERMAL

- Dermal Necrosis
- Dermal sloughing
- Systemic signs
 - listlessness, anorexia
 - soft faeces, rough coat

Gastrointestinal Toxicities

ARSENIC TREATMENT

- Chelation therapy
 - British Anti-Lewisite (BAL)
 - Succimer dimercaptosuccinic acid (DMSA)
- Intensive supportive care
 - Fluids

Gastrointestinal Toxicities

COPPER SOURCES

- Pesticides
 - Dips and orchard sprays
- Supplements (Oral & Injectables)



Gastrointestinal Toxicities

COPPER Toxicity

- Excess copper causes:
 - Haemolysis (oxidises RBCs)
 - Hepatocellular necrosis
 - Haemoglobinuria (red urine)

Gastrointestinal Toxicities

COPPER Clinical Signs:

- Abdominal pain & GI haemorrhage
- Thirst
- Salivation
- Vomiting
- Staggering gait
- Weak rapid pulse

Gastrointestinal Toxicities

COPPER Clinical Signs:

- Pale mucous membranes or jaundice
- Diarrhoea
- Prostration
- \pm Hypothermia



Pale mucous membranes



Gastrointestinal Toxicities

COPPER Post mortem:

- Urine-Haematuria
- Liver-Swollen, bronze, nutmeg
- Kidneys-metallic sheen
- ± Jaundice
- Gastroenteritis



Gastrointestinal Toxicities

COPPER TREATMENT

- ± Chelation therapy
 - D-Penicillamine
- Supportive care
 - Fluids
 - Molybdenum and sulphate
 - bind to copper (gypsum CaSO_4)

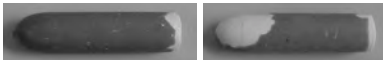
COPPER Key Points:

- Sheep and calves
- Acute vs subacute vs chronic
- Haemolytic crisis (chronic)
- Liver enzyme ↑ AST
- Copper levels in liver (?), kidney
- Prostration
- Metallic (gun metal) sheen to kidneys

Gastrointestinal Toxicities

ZINC Sources

- Facial eczema prophylaxis
- Galvanised metal fence, pipes
- Paints and zinc batteries



Gastrointestinal Toxicities

ZINC Sources

- Footrot baths
- Facial Eczema treatment cattle



ZINC

- Vomiting
- Abdominal pain
- Dehydration
- Decreased production (e.g. milk)
- GI bleeding
- Haemolysis and haematuria (monogastrics)

Gastrointestinal Toxicities

ZINC Diagnosis

- Post mortem pancreas & abomasum
 - abomasal oedema
 - abomasal necrosis
 - fibrotic pancreas



Gastrointestinal Toxicities

ZINC Diagnosis

Post mortem

Haemolytic crisis



Serum and Tissue zinc levels

(eg pancreas, liver, kidney)

Gastrointestinal Toxicities

ZINC TREATMENT

- Remove zinc
- Chelate zinc with baking soda, egg white and tannic acid
- Symptomatic and supportive care

- \pm Chelation therapy e.g. BAL, CaEDTA
 - of questionable value in zinc toxicity but effective in birds



Gastrointestinal Toxicities

PHOSPHORISED PESTICIDES

Sources:

- Pesticide Use
 - White or yellow phosphorus
- Toxicity - lethal dose:
 - rabbit 4 mg/kg, possum 6-10 mg/kg
 - dog < 1 mg/kg

Gastrointestinal Toxicities

PHOSPHORISED PESTICIDES

Toxicity

- Phosphorus oxidised to phosphate
 - Protoplasmic poison
 - Extensive injury to organs and tissues
 - Strong irritant
 - damages hepatic cells - periportal

Gastrointestinal-Hepatic Toxicities
PHOSPHORISED PESTICIDES

Clinical Signs:

- Luminous vomit (+ garlic odour)
- Abdominal pain, Anorexia
- Haemorrhagic gastroenteritis
- Liver failure (latent phase)

Gastrointestinal Toxicities
PHOSPHORISED PESTICIDES

Clinical Signs/Effects

- Hypoprothrombinaemia
- Delayed photosensitivity in ruminants
- Hepatic and renal damage
- Oliguria

Gastrointestinal-Hepatic Toxicities
PHOSPHORISED PESTICIDES

- Clinical Pathology
 - Increase in liver enzymes
 - Increase in BUN (blood urea nitrogen)
 - Hypoglycaemia
 - Haematuria, albuminuria

Gastrointestinal-Hepatic Toxicities
PHOSPHORISED PESTICIDES

- Postmortem changes in liver
 - fatty degeneration
- Gastrointestinal irritation
 - haemorrhage, necrosis
- Renal tubular necrosis

Gastrointestinal Toxicities

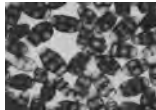
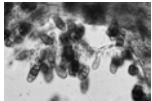
PHOSPHORISED PESTICIDES TREATMENT

- Early-copper sulphate 1%
- Symptomatic and supportive care
- DO NOT give Oils

Hepatic Toxicities

FACIAL ECZEMA

- *Pithomyces chartarum*
 - renamed as *Leptosphaerulina chartarum*
- Sporidesmin toxin
- Ryegrass pastures

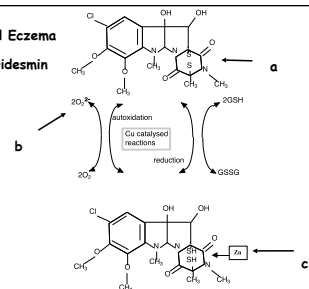


Hepatic Toxicities

FACIAL ECZEMA

- Mechanism of action
 - Cycle of oxidation and reduction
 - Superoxide radicals form
 - Hepatic ductular epithelium injury
 - Biliary system obstruction (pericholangitis)

Facial Eczema sporidesmin



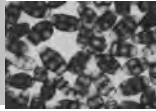
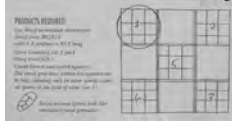
Hepatic Toxicities

FACIAL ECZEMA

- Monitoring
- Spore counts



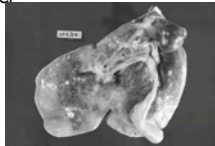
— SPORE COUNTING KIT —



Hepatic Toxicities

FACIAL ECZEMA

- Post mortem changes
- boxing glove liver



Hepatic Toxicities

FACIAL ECZEMA PREVENTION

- Breed for resistance
- Pretreat with zinc
- Pasture treatment with fungicides
- Treatment-Symptomatic

Gastrointestinal-Hepatic Toxicities

PARACETAMOL

- Depletes glutathione
- Oxidative injury
- dogs-liver
- cats-RBCs

Gastrointestinal-Hepatic Toxicities

PARACETAMOL-DOGS

Also known as ACETAMINOPHEN

- Vomiting, Anorexia
- Tachycardia, Tachypnoea
- Abdominal pain
- \pm Methaemoglobinaemia
- Facial and paw oedema

Gastrointestinal-Hepatic Toxicities

PARACETAMOL-DOGS

- Acute hepatic centrilobular necrosis
 - 24-36 hours post ingestion
- * Not known to cause renal injury in dogs and cats but reported in humans

Gastrointestinal-Hepatic Toxicities

PARACETAMOL-CATS

- Cyanosis
- Vomiting
- Dyspnoea
- Oedema, face + paws



Gastrointestinal-Hepatic Toxicities

PARACETAMOL-CATS

- Methaemoglobinaemia,
 - Heinz body anaemia
- Hypothermia
- Depression

Gastrointestinal-Hepatic Toxicities

PARACETAMOL
TREATMENT

- Symptomatic and supportive care
- N-acetylcysteine (Parvolex)
- Methaemoglobinaemia
 - Methylene blue or ascorbic acid

Gastrointestinal-Hepatic Toxicities

SUMMARY

- Phosphorus
 - Luminous vomit
- Chelation therapy
 - arsenic, copper, \pm zinc
- Paracetamol
 - Face and paw oedema

Gastrointestinal-Hepatic Toxicities

SUMMARY

- Facial Eczema
 - Photosensitisation
 - Boxing glove liver
- Zinc
 - Oedematous or fibrotic pancreas

Gastrointestinal-Hepatic Toxicities

BLUE-GREEN ALGAE

microcystins and nodularin

- Weakness
- Vomiting
- Diarrhoea
- Depression
- Hepatic necrosis



Gastrointestinal-Hepatic Toxicities

BLUE-GREEN ALGAE TREATMENT

- Symptomatic and Supportive care