INTOKSIKASI

DISIAPKAN OLEH :

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Three Types

- Type 1: Silent Disorders
- Type 2: Acute Metabolic Crises
- Type 3: Neurological Deterioration

Biotoxins

- Blue green algae
- Botulism
- Bufo toads
- Mycotoxins
- Venomous Reptiles

Blue green algae

- *Anabaena* spp., *Aphanizomenon* spp., *Microcystis* spp.
- Ponds with fertilizer runoff in warm weather
- Neurotoxic alkaloid and anticholinesterase toxins [anatoxin-a and anatoxin-a (s)]

- Neurotoxic saxitoxin from *Aphanizomenon*
- Hepatotoxic toxins (cyclic peptides) from *Microcystis* called microcystins
- Microscopic evaluation of algae
- Kill blooms with copper sulfate

Botulism

- *Clostridium botulinum*
- 7 serotypes: C & D common in animals
- Horses: "Shaker Foal Syndrome" or "Toxicoinfectious Botulism" with type B
- Sites of infection include: navel, wounds, gastric ulcers, necrosis of the liver, gut in assoc. with sand ingestions

- Inhibits degranulation or exocytosis of acetylcholine at synapses
- Signs include: myasthenia, progressive flaccid paralysis of muscles ("limberneck" in affected birds)
- Tmt: Na/K penicillin or ampicillin, trivalent antitoxin, supportive care

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Bufo Toads

- *Bufo marinus* & *Bufo alvarius*
- Florida and Colorado River Toad
- Neurotoxic and cardiotoxic
- Bufagins, bufotoxins, bufotenines which all have digitalis like effects on the heart
- Monitor for arrhythmias
- Propranolol, maintain airway, pentobarbital, monitor EKG

Mycotoxins

- Secondary fungal metabolites

- Aflatoxins
- Deoxynivalenol (DON or vomitoxin)
- Ergot alkaloids
- Fumonisins
- Penitrem A
- Zearalenone

Aflatoxins

- from *Aspergillus flavus* & *Aspergillus parasiticus*
- Grow on corn, cotton seed, peanuts
- Black light test detects kojic acid (screening test)
- Limits in feed higher for meat than dairy animals
- Sensitivity order (most to least): ducklings, fish, dogs, pigs, cattle, sheep, chickens

Aflatoxins

- Potent hepatotoxins and hepatocarcinogens (alter DNA template)
- Liver, hematopoietic and immunologic effects
- Ammoniation of feed has reduced aflatoxin levels
- Keep stored grains dry and cool

Ergot Alkaloids

- Ergotamine, Ergocristine, Ergonovine
- produced by the fungus *Claviceps* spp.
- *Claviceps purpurea* most common in the midwest on rye, wheat, barley, oats and several grasses (brome, timothy, quack)
- Gangrenous ergotism & tissue sloughing from prolonged contraction of smooth muscle (vasoconstriction)
- Also decreased milk production (inhibition of prolactin due to dopaminergic action)
- LSD like effects may also be seen (nervous signs)

Fumonisins

- Trichothecene mycotoxins produced by *Fusarium* spp..
  Main one is Fumonisin B1 from *Fusarium moniliforme*
- Fumonisin B1 responsible for Equine Leukoencephalomalacia (ELEM) or "moldy corn poisoning" with resultant CNS signs
- May see pulmonary, hepatic and renal syndromes with these toxicants when cattle, swine or sheep are poisoned

Drugs

- Acetaminophen
- Ivermectins
- Marijuana
- Nonsteroidal Antiinflammatory Drugs

Acetaminophen

- NEVER use in cats, cats lack glucuronyl transferase required for conjugation
- Depletes glutathione, and when glutathione is used up, acetaminophen binds to cellular macromolecules
- Signs include: facial and/or paw edema, cyanosis, methemoglobinemia, vomiting, depression. Dogs have shown centrilobular hepatic necrosis in 24 hr
- Treatment: aggressive decontamination, (Mucomyst) N-acetylcysteine and ascorbic acid

Ivermectins

- Collies are most susceptible to toxicosis as well as chelonians (red-footed tortoise)
- Potentiate GABA by increasing release of GABA, enhancement of GABA binding and direct GABA agonistic effects. Increase Cl conduction through Cl channels
- Signs: severe depression to coma
- Treatment: AC is key as Ivermectin is eliminated in feces, physostigmine has been used to reverse the CNS depression for a limited time

Marijuana (*Cannabis sativa*)

- THC (tetrahydrocannabinol) is the pharmacologically active resin
- CNS depressant with resultant C.S.
- Prolonged depression (18-36 hr in dogs)
- Antiemetic properties may prevent decontamination by emesis
- Activated charcoal and a saline cathartic

Aspirin

- Aspirin and salicylates decrease aggregation of platelets and prostaglandin synthesis
- Initial respiratory ALKALOSIS with subsequent metabolic ACIDOSIS
- Gastric ulcers with hematemesis, vomiting, dehydration, depression, convulsions, hemorrhage
- Treatment: fluids, “bicarb”, transfusions, sucralfate (carafate), cimetidine (tagamet)

Carbohydrate (Grain) Overload

- Highly fermentable CHO feeds (finely ground grains, brewers' grains, green corn, sweet corn, bakery bread, apples, sugar beets)

- Gram + *Streptococcus* and *Lactobacillus* become predominant with large quantities of lactic acid being produced

Carbohydrate (Grain) Overload

- Fluids move into rumen and GI (diarrhea), death of "good" bacteria, pH drop with rumen stasis (severe when pH drops to 4 or 5)
- Blood pH also falls, urine becomes acidic (lactate)
- If animal lives, watch for bacterial or mycotic rumenitis, rumen parakeratosis, liver abscesses, bloat, laminitis

Cyanide or Prussic Acid (HCN)

- *Prunus* spp. cherry, plum, peach
- *Sorghum* spp. sorghum & *Triglochin* arrowgrass
- Cyanide accumulates in leaves and seeds of plants
- Reacts with Fe+++ (ferric) of cytochrome oxidase preventing it from converting to Fe++ (ferrous) form so that electron transport and cellular respiration are halted

Cyanide or Prussic Acid (HCN)

- Rumen contents smell like "bitter almonds"
- Field test of forage for cyanide is called "Picrate test"
- Treatment (**1**) induce methemoglobinemia (Fe+++) with sodium nitrite so that cyanide ion will bin and reduce the amount available to cytochrome oxidase (cyanmethemoglobin). (**2**) Sodium thiosulfate reacts with cyanmethemoglobin to form hydrogen thiocyanate which is excreted in the urine (rate limiting enzyme is rodanase)

Garbage Ingestion

- Hazard due to bacterial overgrowth or spoilage of food
- *Streptococcus* spp., *Salmonella* spp., *Bacillus* spp., also endotoxins from Gram -
- Treatment: limit absorption (activated charcoal), combat fluid and electrolyte imbalances, fight shock and secondary pancreatic hypoperfusion, control bacterial proliferation and septicemia

Ammonia

- Found in enclosed animal facilities where ventilation is poor and feces and other wastes are allowed to accumulate and decompose on a solid floor
- Highly water soluble so tends to go into aqueous layer of the surface of the eye and upper airways resulting in irritation
- Keratoconjunctivitis, corneal opacity and tracheitis. Also more resp. tract infections

Carbon Monoxide

- Lighter than air, formed from incomplete combustion of petroleum (heaters in confinement facilities)
- CO prevents oxygen bound to Hb from being released to the tissues (blood appears cherry red)
- Treatment is hyperbaric oxygen

Peripartum Ammonia Intoxication

- Ammonia in peripheral blood doubles when liver triglyceride concentrations increased during the postpartum *(Zhu 2000)*
- Early lactation cows also consume more total and ruminally degradable protein than do prepartum cows

Ammonia toxicity

- Affects intermediary metabolism
- Decreases the ability of hepatocytes to synthesize glucose
- Increases the incidence of metabolic disorders
- Reduces milk production
- Affects eggs and embryos and impairs reproductive performance