



A Monthly e Magazine
ISSN:2583-2212

June, 2023; 3(06), 935-937

Popular Article

Clinical sign and post-mortem findings in the poisoning of phosphorus in animals

Jay K. Desai and Seema Kumari Bishnoi
<https://doi.org/10.5281/zenodo.7998522>

Phosphorus along with calcium is an integral constituent of the animal body and is universally distributed in soil and plants. About 80% of the total body phosphorus is deposited in bones and teeth in combination with calcium while rest is primarily in organic combinations. Deficiency of phosphorus in diet result into rickets and osteomalacia is a common syndrome.

Sources of poisoning

Though phosphorus poisoning is of rare occurrence in farm animals because of lack of exposure, but accidental ingestion of fertilizer whilst still in sacks or immediately after spreading (from clumps of fertilizer on cultivated land), fireworks. Baits containing lumps of white phosphorus for rats, pets or ants kept on the pastures or ingestion of rats poisoned with rodent baits or grazing of animals on the battle fields where certain explosives have been used. Phosphorus is occasionally added to fats and oils in finely divided form to aid in absorption; however, excessive ingestion of these fats and oils can also cause phosphorus toxicity. White or yellow phosphorus is hazardous, while red phosphorus is toxic yet inert. The potential for toxicity in phosphates is relatively minimal. Before poisoning symptoms show, these must be consumed in large amounts.

Mechanism of toxicity

There is no precise mechanism for phosphorus-induced toxicity. However, phosphorus causes significant irritation of the gastrointestinal mucosa and causes gastroenteritis and diarrhea due



to its local caustic effect. Any phosphorus that is ingested circulates in the bloodstream as an element first before being oxidized to phosphate, which leads to hepatic degeneration.

Clinical signs

In acute poisoning, the chief symptoms include salivation, nausea, vomiting, severe diarrhea with minor abdominal pain, fever, polydipsia, and polyuria. In per-acute toxicity, animals die after exhibiting strong abdominal pain, violent convulsions, severe CNS depression, and coma. The majority of poisoned animals also show signs of jaundice, hematuria, and oliguria before passing away from delirium, convulsions, and coma. Indicators of gastroenteritis occur within 1-2 hours, and depending on the level of toxicity, the disease lasts for 3–5 days. Pigs vomit wildly, and the vomitus is brilliant in the dark and emits a distinctive garlic aroma. However, without any other clear indicators, salivation in horses and paralytic-like paralysis in birds are seen. Chronic poisoning in animals is uncommon, but exposure to phosphorus-containing gases in industrial plants poses a serious occupational risk to people.

Post-mortem lesions

1. Congestion and hemorrhagic inflammation of gastrointestinal tract.
2. In some of the cases, hydrothorax and oedema of other parts of the body.
3. Fatty degenerative changes with centrilobular necrosis in liver.
4. Fatty changes are also observed in kidneys and heart.
5. Inflammation of the mucus membrane of stomach and intestines.
6. Garlic like odor of the gastrointestinal tract contents,
7. Liver is enlarged, pale and yellowish in color.
8. Spleen is small and atrophied.
9. Extravasation of blood into subcutaneous tissues and muscles.
10. In birds, visible fumes of phosphorus can be appreciated on opening the gizzard.

Diagnosis

1. History
2. Clinical symptoms particularly acute gastroenteritis
3. Post-mortem findings
4. Garlic odor of the vomitus and intestinal contents



5. Estimation of phosphorus in the blood, vomitus, intestinal contents and faeces.

Note: The specimens that will be sent for laboratory analysis shouldn't have any preservative added.

Differential diagnosis

1. Inorganic poisonings (arsenic, lead, mercury) causing gastroenteritis and diarrhea.
2. Organophosphate compounds.

Treatment

There isn't a known treatment for phosphorus poisoning. However, treatment involves administering activated charcoal, emetics, or purgatives in an effort to remove the toxin from the body. Saline purgatives should be used instead of oily ones because they do not favor phosphorus absorption. Give symptomatic treatment as well, such as gastrointestinal demulcents and astringents for gastroenteritis and excess fluid therapy to replace lost electrolytes and fluids. Give cardiac stimulants and an intravenous glucose infusion in shock- like circumstances.

