

# Rodenticide Toxicosis: Phosphides

(Poisoning from Phosphide Rodent Poison)

## Basics

### OVERVIEW

- Used as a rodent poison (known as “rodenticide”) since the early 1930s at various concentrations in powder, pellet, or paste formulation.; available as zinc, aluminum, and magnesium salts
- Commonly have a distinctive odor, often described as rotten fish, or garlic
- Most common route of exposure is by eating; however, toxicity can occur via inhaling and absorption through broken skin
- When broken down, it leads to phosphine gas production that has corrosive and irritant effects on the digestive tract lining, which leads to vomiting, blood in vomit (known as “hematemesis”), or black tarry stools due to digested blood (known as “melena”)
- The gas is rapidly absorbed and distributed system-wide leading to effects on other organ systems

### GENETICS

- Not applicable

### SIGNALMENT/DESCRIPTION OF PET

#### Species

- Dogs
- Cats

#### Breed Predilections

- Any breed

#### Mean Age and Range

- Any age

#### Predominant Sex

- None

### SIGNS/OBSERVED CHANGES IN THE PET

#### Historical Findings

- May or may not be seen eating or otherwise being exposed to the poison

#### Physical Examination Findings

- Signs generally occur within 15 minutes to 4 hours, but can be delayed up to 18 hours



- Gastrointestinal (digestive system)—loss of appetite (known as “anorexia”), vomiting, and dark tarry stools
- Cardiovascular (heart and blood vessels)—direct heart muscle damage, heart rhythm disturbances, decreased strength of heart contractions, low blood pressure
- Respiratory (upper and lower airways and lungs)—fluid in the lungs (known as “pulmonary edema”), fluid around the lungs (known as “pleural effusion”)
- Blood/lymph/immune—red cell damage
- Nervous—walking with wobbly drunken appearance (known as “ataxia”), weakness, tremors, increased sensitivity to stimuli (known as “hyperesthesia”), and seizures
- Renal/Urologic (Kidney/Urinary)—toxin nitrogen product buildup in bloodstream (known as “azotemia”), acute (sudden) kidney failure
- Hepatobiliary (liver and bile system)—increased liver enzymes, and bilirubin (the compound causing the yellow color in jaundice)
- Endocrine (hormonal)/metabolic—acidic blood pH (known as “metabolic acidosis”, electrolyte imbalance (electrolytes are free elements in the bloodstream such as sodium, potassium)
- Musculoskeletal (muscle and bone)—weakness

## CAUSES

- Increased breakdown occurs in a moist, acidic environment; thus recent meal increases acidity in the stomach and increases rate of breakdown
- Owner should not feed their pet
- Owners and veterinary staff are at risk for breathing in exposure if the animal vomits in a poorly ventilated area; owners should lower their windows on the way to the clinic to reduce risk of breathing in fumes

## RISK FACTORS

- Feeding the animal increases rate of poison breakdown and release of toxin
- Poor ventilation may allow breathing in by people of harmful fumes
- Bait (unsecured) in the environment triggers risk of exposure

# Treatment

## HEALTH CARE

- There is no antidote
- The goal of treatment with recent exposure and patients showing signs is to safely decontaminate
- Administration of a liquid antacid such as magnesium hydroxide, aluminum hydroxide, calcium carbonate, or even a 5% sodium bicarbonate solution may help to make the stomach less acid, and thus decrease phosphine gas production
- Vomiting may be induced with apomorphine, or gastric lavage and hydrogen peroxide may also be considered for gastric emptying
- Activated charcoal may help decrease toxicity by reducing absorption, but will only be given only if the patient’s signs are not too severe
- The patient should be placed on IV (intravenous) fluid therapy and monitored for any progression of signs for at least 18 hours
- Supplemental oxygen for low body oxygen levels may be needed

## DIET

- Not fed until rodenticide cleared from the system

## SURGERY

- Not applicable

# Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all-inclusive

- Digestive system protectants such as famotidine, omeprazole, sucralfate
- For tremors, methocarbamol may be elected
- Seizures may require anticonvulsants such as diazepam, phenobarbital, levetiracetam, propofol
- If liver enzymes are elevated the veterinarian may elect to give hepatoprotectants such as S-adenosylmethionine (SAM-e), silymarin/milk thistle, and vitamin K1
- Antioxidant for red cell damage may consider N-acetylcysteine
- If painful, analgesics such as hydromorphone or tramadol may be used

## **Follow-Up Care**

### **PATIENT MONITORING**

- Several organ systems may be followed: vitals, heart rhythm, blood pressure, nervous system function will be monitored for 18 hours or so

### **POSSIBLE COMPLICATIONS**

- Liver failure
- Kidney failure

### **EXPECTED COURSE AND PROGNOSIS**

- Patients not showing signs will be monitored for up to 12–18 hours
- Patients showing signs will be monitored for at least 48 hours or until any life-threatening signs have resolved

## **Key Points**

- The release of the phosphine gas can be deadly, so care must be taken not to have caregiver or staff exposed to burped or vomited up fumes
- Prompt care is essential
- Avoid feeding until the crisis has passed and the bait is out of the digestive tract