

*Peer Reviewed*

# Just Another Rat Bait?



Sara, a 4-year-old spayed pit bull mix, presented to the emergency clinic after ingesting an unknown type of rodenticide.

## CLINICAL PRESENTATION

During a visit with another family, Sara accidentally ingested what her owner believed to be approximately one-half cup of green-colored mouse and rat poison. The owner stopped at home before bringing Sara to the clinic, resulting in a 30-minute delay.

## HISTORY

Three months before presentation, Sara underwent a physical examination and received scheduled vaccinations. At the time, she was in excellent health and weighed 55 lb.

## TREATMENT

Because ingestion was recent, emesis was induced with 20 mL of hydrogen peroxide to allow appropriate decontamination. Five minutes later, Sara vomited 1 cup of green pellets. Delayed decontamination (hours out) may be ineffective if toxin has moved out of the stomach.

CONTINUES

## Ask Yourself...

What is your next step?

- A. Send the patient home, as there are no further concerns after she vomited the bait.
- B. Send the patient home with 7 days of vitamin K<sub>1</sub>.
- C. Monitor renal panels daily for 2 to 4 days, check electrolytes and baseline prothrombin time (PT) in case of previous unknown exposure, then start vitamin K<sub>1</sub> for 30 days.
- D. Monitor renal panels (as in answer C) but check the PT at 48 and 72 hours' post-exposure without vitamin K<sub>1</sub>.

PT = prothrombin time

**CORRECT ANSWERS**

**C. Monitor renal panels daily for 2 to 4 days, check electrolytes and baseline prothrombin time (PT) in case of previous unknown exposure, then start vitamin K<sub>1</sub> for 30 days.**

**OR**

**D. Monitor renal panels (as in answer C) but check the PT at 48 and 72 hours' postexposure without vitamin K<sub>1</sub>.**

Even though anticoagulants are the most common rodenticides (see **Rodenticides**), it is not possible to differentiate the 4 to 5 different active ingredients based on color alone (eg, green vs blue). Follow-up blood work is required to ensure that other active ingredients were not ingested.

Baseline blood work is imperative (**Table 1**). Monitoring renal function q24–48h after ingestion can help determine whether cholecalciferol rodenticide is involved. Any evidence of elevated calcium,

phosphorus, or renal values warrants immediate, aggressive IV fluid therapy and treatment.

If a long-acting anticoagulant is ingested, therapy should include either monitoring the PT for 48 hours after decontamination with no vitamin K<sub>1</sub> therapy until the PT results are obtained *or* prophylactic vitamin K<sub>1</sub> therapy at 3 to 5 mg/kg PO q12h for 30 days, followed by checking PT for 48 and 72 hours after the *last dose* of vitamin K<sub>1</sub>.

Of note, the risk for rodenticide toxicity can be reduced with decontamination via emesis and activated charcoal if appropriate (eg, toxic dose ingested within the time frame for appropriate emesis induction, asymptomatic patient).

In addition, knowing the color and shape of the bait does not help identify the specific rodenticide involved. When the type of rodenticide is unknown, treatment needs to be aimed at the 4 main types—anticoagulants, neurotoxins, cholecalciferol, and zinc phosphide—because signs of toxicity may not be seen for 1 to 3 days.

Aldicarb, strychnine, and zinc phosphide act quickly, so exposed animals will be symptomatic within minutes to a few hours; however, these rodenticides are rarer.

**FOLLOW-UP**

In this case, the rodenticide was confirmed as bromethalin, and Sara was observed overnight (ie, for 12 hours) to ensure that no neurologic signs developed. In addition, she received a second dose of activated charcoal at 2 g/kg PO 6 hours after presentation and was treated with SC fluids and an antiemetic. Of note, Sara's baseline PT, electrolytes, and renal panel were normal on day 1 of exposure. Because a long-acting anticoagulant was not involved, vitamin K<sub>1</sub> therapy and additional blood work were unnecessary. The patient was released, as decontamination had been successful.

The ASPCA Animal Poison Control Center recommendations for treating bromethalin ingestion are provided in **Table 2**.

PT = prothrombin time

**RODENTICIDES**



- **Anticoagulants**—Most common type of rodenticide; includes warfarin, bromadiolone, chlorophacinone, difethialone, and brodifacoum
- **Neurotoxins**—Bromethalin; causes cerebral edema and seizures
- **Cholecalciferol**—Causes hypercalcemia and soft tissue calcification, including heart, intestines, and (most notably) kidneys
- **Zinc phosphide**—Releases phosphine gas and may cause damage to tissues with high oxygen demand; signs can include anorexia, vomiting (often with blood), rapid and deep respirations, ataxia, weakness, and seizures; odor of spoiled fish or garlic is suggestive of phosphide rodenticide, and caution must be taken to prevent secondary exposure to pet owners and veterinary professionals (public health risks)
- **Aldicarb**—Highly toxic carbamate that causes acute onset of drooling, tremors, urination, defecation, and vomiting and can result in death
- **Strychnine**—Still available and typically causes vomiting, drooling, tremors, disorientation, ataxia, weakness, rigidity, tachypnea or dyspnea, and violent and tetanic seizures

**Table 1. Baseline Blood Work**

Parameter	Comment/Action
Sodium	Monitor sodium levels because of the potential for hypernatremia after administration of activated charcoal, particularly with more than 1 dose
Prothrombin time	PT is typically normal when patient is on vitamin K <sub>1</sub> therapy
Renal	Calculate serum calcium-phosphorus product daily for 2–4 days; monitor BUN, creatinine, serum calcium, and phosphorus values

BUN = blood urea nitrogen

**Table 2. Decontamination Recommendations for Bromethalin Ingestion<sup>1,\*</sup>**

Time Since Exposure & Dose Ingested <sup>†</sup>	Action
<b>Dogs</b>	
<4 hr 0.1–0.49 mg/kg	Emesis or 1 dose activated charcoal
>4 hr 0.1–0.49 mg/kg	1 dose activated charcoal
<4 hr 0.5–0.75 mg/kg	Emesis & 3 doses activated charcoal over 24 hr
>4 hr 0.5–0.75 mg/kg	3 doses activated charcoal over 24 hr
<4 hr >0.75 mg/kg	Emesis & 6 doses activated charcoal over 48 hr
>4 hr >0.75 mg/kg	6 doses activated charcoal over 48 hr
<b>Cats</b>	
<4 hr 0.05–0.1 mg/kg	Emesis or 1 dose activated charcoal
>4 hr 0.05–0.1 mg/kg	1 dose activated charcoal
<4 hr 0.1–0.3 mg/kg	Emesis & 3 doses activated charcoal over 24 hr
>4 hr 0.1–0.3 mg/kg	3 doses activated charcoal over 24 hr
<4 hr >0.3 mg/kg	Emesis & 6 doses activated charcoal over 48 hr
>4 hr >0.3 mg/kg	6 doses activated charcoal over 48 hr

\* As recommended by the ASPCA Animal Poison Control Center

† 1 oz of 0.01% bromethalin bait contains 2.84 mg of bromethalin



## Take-Home Messages

- Not all rodenticides are anticoagulants.
- Until the active ingredient can be appropriately identified, practitioners need to consider all types of rodenticides. Do not assume it is a long-acting anticoagulant.
- Sources of information on bait type:
  - ▶ EPA registration number
  - ▶ Pest control official (often will answer message left after business hours)
  - ▶ Receipt from pest control

See Aids & Resources, back page, for references & suggested reading.