

Anticoagulant Rodenticide Toxicity

Kristi S. Lively, DVM, DABVP

BASIC INFORMATION

Description

Ingestion (eating) of certain rodent poisons (rodenticides) by dogs and cats can cause bleeding problems because they act as anticoagulants (prevent blood clotting). The pet may directly ingest rodent bait, may ingest food contaminated with the poison, or may even ingest a rodent that has died from the poison (especially cats).

Active ingredients in these rodenticides fall into two categories, *coumarin-based products* (warfarin, coumafuryl, brodifacoum, and bromadiolone) and *indanedione-based products* (diphacinone, pindone, yalone, and chlorophacinone). Coumarin-based products have a shorter duration of action.

Agents in these categories also fall into two generations, depending on when they were first developed.

- First-generation anticoagulants (warfarin, pindone, coumafuryl, coumachlor, isovaleryl-indanedione) are less toxic and often require ingestion of a larger amount to be problematic.
- Second-generation anticoagulants (brodifacoum, bromadiolone) are highly toxic after a single exposure.

Most of these poisons are bright blue-green pellets, and dogs and cats often confuse them for tasty kibble.

Causes and Toxicity

These products interfere with vitamin K activity in the body, which is required for blood to clot normally. When vitamin K–related clotting proteins are inactive, signs of bleeding occur. Coumarin-based products affect vitamin K for days, whereas the effects of indanedione-based products may last for weeks.

Clinical Signs

Signs can take several days to develop, because vitamin K stores must first be depleted. Signs are related to anemia or bleeding tendencies. External signs of bleeding are not always present if the bleeding is internal, so weakness and depression may be the only signs noted. Pale gums; bruising; nose bleeds; blood in the urine, feces, or eyes; or difficulty breathing may occur. Bleeding may be sudden and life-threatening.

Diagnostic Tests

If ingestion of the rodenticide is seen by the owner, the diagnosis is straightforward. Not all rat poisons are anticoagulants, so it is important to inform your veterinarian which product was ingested. If ingestion or exposure was not witnessed, other causes of bleeding must be ruled out through a series of laboratory tests that assess platelets, various aspects of blood clotting, and effects on other organs. A test to detect abnormally high levels of inactive vitamin K–dependent proteins (PIVKA

test) may be submitted. Additional tests, such as x-rays and an ultrasound, may be recommended.

TREATMENT AND FOLLOW-UP

Treatment Options

If ingestion has just occurred, vomiting may be induced to minimize absorption of the toxin. Treatment involves providing adequate vitamin K1 so that blood clotting remains normal. Even if the poison is vomited and there is no external evidence of bleeding, treatment with vitamin K1 is usually instituted to ensure patient safety. Contact your veterinarian immediately if you suspect possible ingestion of rat poison, even if your pet seems fine, so that blood clotting can be assessed and preventive treatment can be started.

The duration and dosage of vitamin K1 required depend on the type of toxin ingested. Coumarin products are active for days, whereas indanedione products are active for weeks. First-generation products require lower doses of vitamin K1 than second-generation products. If the exact type of toxin is not known, treatment is often given at high doses for 4-6 weeks. Initially, vitamin K1 may be given by injection for 1-2 days, and then pills may be started. Oral vitamin K1 is given with food to maximize its absorption.

If bleeding and anemia are severe, hospitalization is often necessary. Whole blood or plasma transfusions and intensive supportive care needed to stabilize the patient.

Follow-up Care

Certain clotting and other laboratory tests are often repeated during therapy and 48 hours after stopping vitamin K to ensure that there is no more active toxin in the system. If clotting tests are abnormal after the drug is stopped, vitamin K treatment is usually continued for 2 more weeks. If the vitamin K is stopped for longer than 48 hours and the toxin is still active, bleeding may recur, so it is very important to precisely follow your veterinarian's instructions. Notify your veterinarian if any signs recur or any changes occur in the medication schedule.

Prognosis

Because vitamin K1 is the antidote for anticoagulant rodenticide toxicosis, prognosis is excellent if treatment is started in a timely manner and is carried out for an appropriate duration with adequate patient monitoring. In cases of severe anemia and bleeding, where aggressive hospitalization and transfusions are needed, prognosis is more guarded (uncertain). These rodenticides can be lethal to dogs and cats.