RODENTICIDE INTOXICATION

Intoxication with various substances intended for killing rodents is a **common problem in dogs** and sometimes cats. There are many products available, but **most fall** into one of **three categories**, based on the mechanism of action. Those that inhibit the function of vitamin K (vitamin K antagonists) are the most common culprits, causing dogs to present to the Emergency Service. The other two categories are calcifying substances and uncouplers of oxidative phosphorylation.

Vitamin K is essential to the function of several blood coagulation factors. When it is antagonized, these factors can not take part in the cascade needed for the **formation of a blood clot**. Thus, **bleeding into multiple body spaces** can occur. If untreated, this may lead to a fatal anemia and often compression of the heart and lungs, preventing normal function. There is a **2-7 day lag** period between ingestion and the onset of bleeding, varying between compounds (**warfarin, diphacinone, brodifacoum and bromadiolone**). But immediate veterinary attention should always be sought as soon as possible, even if ingestion is only partially suspected. If caught early enough, vomiting can be induced and prevent systemic absorption. Typically vomitus from dogs that have ingested one of these compounds is bright blue-green in color.

The **most common clinical signs**, once bleeding begins, are weakness, lethargy, collapse, pale mucous membranes, panting, an increased respiratory effort, possibly perceivable abdominal distention and/or pain to the touch of the chest or abdomen. **Emergency veterinary care must be sought immediately**. A presumptive diagnosis by the veterinarian is usually made by documentation of **prolongation of the PT** coagulation test. **Initial therapy** generally involves oxygen supplementation, aggressive fluid therapy, plasma and/or whole blood transfusions, injectable Vitamin K administration and other general supportive/symptomatic therapies. **Intensive monitoring** is generally necessary over the first 24-48 hours.

Once no signs of further bleeding or systemic compromise are present and the coagulation times are normal, the patient can usually be **sent home on oral Vitamin K**. The length of time that oral Vitamin K needs to be administered varies between products. **Generally, at least one month** of therapy is required. After a month, the Vitamin K is discontinued and a coagulation screen in re-checked in three days. If the screen is normal, no further treatment is indicated. If there is still significant prolongation, Vitamin K therapy is re-instituted for another two weeks, then the PT repeated.

Probably the next most common category of rodenticides to cause small animal intoxication is the **calcifying substances**. **Cholecalciferol or Vitamin D3 products** increase blood calcium concentrations much higher than normal. The calcium then deposits in various tissues, disrupting normal function. The major organs damaged are the kidneys, intestines and liver. Signs of renal and liver failure and GI signs begin to be seen 24-48 hours after ingestion. If caught early, treatment to chelate/bind the calcium

and potentiate its excretion can be instituted. Even in this situation, the prognosis is fair. If not recognized until **the later stages**, calcification of the tissues can not be reversed and the **prognosis is very poor.**

The uncouplers of oxidative phosphorylation (active ingredient **Bromethalin**) inhibit cellular respiration. At **higher doses**, the body system usually affected first is the central nervous system. Thus, the first clinical signs seen include: severe excitation, tremoring and/or seizuring. At **lower doses**, lethargy, depression, gastrointestinal signs and anorexia predominate. Death occurs with low doses as well as high, especially if low dose exposure occurs repeatedly. **Cats** are reportedly **more sensitive** than dogs. **Either species** however must be treated as an **emergency**. Death ensues from respiratory muscle failure. There are no known antidotes for Bromethalin. **Treatment** is primarily **supportive**- control of swelling in the brain, oxygen supplementation or ventilation if complete respiratory failure and control of seizures. The overall prognosis is poor with out prolonged intensive care.

Overall, it is **imperative** to seek **immediate emergency attention** if a pet has ingested or is even suspected to have ingested a rodenticide. There are certainly other types that exist and that a pet may be exposed to. The three mentioned above are the most common. Prognosis varies among products, but may be improved by early veterinary care. If the owner/veterinarian can induce vomiting with in 1 hour of ingestion, absorption may be decreased/prevented and is the best possible situation. Additional procedures by the veterinarian to decrease absorption, such as activated charcoal and cathartic administration, can also improve the prognosis.