toxtidbits
the maryland poison center's monthly update. news. advances. information.
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Long-acting Anticoagulant Rodenticides

As mice enter homes and garages to establish their winter residences this time of year, many people resort to using rodenticides to exterminate them. Most of the commercially available rodenticides contain long-acting anticoagulants such as 4-hydroxycoumarin (brodifacoum), bromadialone, chlorphacinone and diphacinone. These "superwarfarin" rodenticides are often placed where they are easily accessible by children and animals, and are often taken intentionally by the suicidal patient.

In 2002, there were 17,100 human exposures to long-acting rodenticides reported to U.S. poison centers. The majority of patients were small children who ingested small amounts and who remained asymptomatic; however, over 400 patients developed some degree of toxicity and there were three fatalities.

The mechanism of action of these rodenticides is identical to that of warfarin (blockade of vitamin K-dependent clotting factor synthesis), but they are more potent and longer-acting. Large or chronic ingestions may result in a severe coagulopathy that can last weeks to months, often accompanied by blood loss. Unintentional, single acute ingestions in children are not likely to result in significant laboratory abnormalities or clinical evidence of bleeding.

Asymptomatic children with unintentional acute exposures to anticoagulant rodenticides may be observed at home for bruising or bleeding within the following 5-7 days. Adults with deliberate ingestions, symptomatic children and children with chronic exposures should be referred to the ED for possible administration of activated charcoal and determination of INR (or PT). Prolongation of the INR should be monitored with serial levels done every 6 to 12 hours. Factor assays (II, VII, IX, X) may be abnormal in patients with a normal INR or PT and PTT and may provide earlier evidence of significant ingestion.

Vitamin K_1 (phytonadione) should be administered in patients with a significantly prolonged INR secondary to ingestion of anticoagulant rodenticides. Oral vitamin K_1 may be given in doses of 15 to 25 milligrams in adults and 5 to 10 milligrams in children, and repeated 3-4 times/day. Intravenous vitamin K_1 is preferable in severe cases requiring rapid correction. An initial IV dose of 10-25 mg of phytonadione should be diluted in saline or glucose and administered slowly (1mg/min) to minimize the chance of anaphylactoid reaction. Vitamin K_1 doses should be adjusted and continued based on the INR. Fresh frozen plasma (FFP) is rich in vitamin K-dependent coagulation factors, acts quickly and may be given to rapidly correct life-threatening INR prolongation.

DID YOU KNOW THAT…… The Maryland Poison Center has trained over 500 pharmacists and pharmacy technicians on bioterrorism?

The poison center has been working with the Maryland Department of Health and Mental Hygiene and the Maryland Board of Pharmacy to increase pharmacists' ability to respond to a bioterrorism release. Plans are being made to continue this training in 2004, and to expand it to include chemical weapons and other aspects of weapons of mass destruction.

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