

Ask A Vet: Preparing for Winter Brings Seasonal Pet Threat

Sunday, November 15, 2015

Dear Dr. Weldy's,

I had a friend recently tell me they had a cat that got very sick and ended up dying of renal failure due to antifreeze poisoning. Is that possible and how does this occur?

Dear Reader,

This is an excellent question since this is the time of year that we are winterizing our vehicles and unfortunately the time of year we see antifreeze poisoning. The ingestion of antifreeze is made up of 95% ethylene glycol (EG) and is one of the common toxicities in dogs and cats but realize all animals can be affected by it. Commercial preparations of antifreeze are diluted with 50% water to be used in your vehicles' cooling system. The most common reason for toxic ingestion is due to improper storage and disposal of the coolant. It is sweet tasting and small amounts can be lethal. In addition to being accidentally ingested as a liquid source in the cold winter, it is also used in heat-exchange fluids that are used in solar collectors, ice-rink freezing equipment, and some brake and transmission fluids. There have been reports of adsorption through skin in some cats. It is more common in cold climates because antifreeze is added to radiators or when cooling systems are flushed. The minimum lethal dose of undiluted ethylene glycol is 1.4 ml / kg (1 kg = 2.2 pounds) body weight in cats, 4.4 ml/kg in dogs, 7-8 ml/kg in poultry and 2-10 ml/kg in cattle.

We know that ethylene glycol is adsorbed from the gastrointestinal tract and peak blood concentrations can occur within 3 hours of ingestion. Half of it is excreted through the kidneys but the other half undergoes some reactions in the liver and kidneys and is metabolized into toxic metabolites that cause severe metabolic acidosis and renal tubular epithelial damage. Clinical signs seen depend on amount and time of exposure. Onset of signs can be almost immediate and consist of vomiting due to irritation of the gut, polydipsia and polyuria (increased drinking and urinating), neurological signs like depression, stupor, ataxia, knuckling, and abnormal righting reflexes of paws. As signs of depression increase, drinking is less which leads to dehydration. Low output of urine leading to renal failure in cats occurs between 12-24 hours and dogs 36-72 hours. Signs of this include lethargy, anorexia, dehydration, vomiting, diarrhea, oral ulcers, salivation, increased breathing, possible seizures or coma. During an abdominal palpation exam, the kidneys are painful due to the swelling of the kidneys.

Damage done to the epithelium of the renal tubules, can create necrosis and the formation of calcium oxalate crystals in the tubules which can be devastating. Without having seen the ingestion, symptoms could be mistaken for trauma, pancreatitis, gastroenteritis, ketoacidotic diabetes mellitus and acute renal failure from other toxins. Diagnosis of problem will be based on history, physical exam and lab findings ran by your veterinarian and the success of treatment depends on timely intervention. Treatment is aimed at lessening adsorption of EG, increasing excretion of EG metabolites and correcting the acidosis.

-Dr. Wanda Schmeltz

