

Toxins from the Garage

A PowerPage Presented By



Due to the large number of toxins in animals, they have been divided over several PowerPages. This page deals with toxins that might be found in your garage. They are sometimes ingested by unwitting pets and can cause serious problems. Ethylene glycol is the most important of these toxins and is emphasized on this page.

Ethylene Glycol

- Found in most commercial **antifreezes**
- Sweet taste leads to frequent intoxication in animals
- Pathophysiology
 - Ethylene glycol is metabolized by **alcohol dehydrogenase** to glycoaldehyde, **glycolic acid**, glyoxalate and **oxalic acid**
- Clinical signs and diagnostic findings
 - Stage I (30 minutes – 12 hours) – Neurological phase
 - Ataxia, knuckling, “drunken behavior” potentially progressing to stupor or coma
 - Anorexia, vomiting
 - **Ca oxalate crystalluria** – can be seen as early as 6 hours post-ingestion
 - PU/PD
 - Stage II (12 – 24 hours) – Cardiovascular phase
 - Tachypnea and tachycardia, often goes unnoticed
 - Later signs (12 hours to 72 hours)
 - Oliguric **renal failure**
 - High anion gap metabolic acidosis
 - **Elevated osmolar gap:**
 - $Osm_{measured} - Osm_{calculated} (2*(Na+K) + BUN/2.8 + Glucose/18)$
 - Hypocalcemia and hyperglycemia
- Treatment- **Must begin before toxic metabolites are generated to be effective**
 - **Fomepizole (4-methylpyrazole or 4-MP)**
 - A competitive inhibitor of alcohol dehydrogenase
 - Most effective within 8 hours of ingestion, dosing q12h for 24-36h recommended
 - Can be used in cats but much higher doses are necessary
 - Expensive
 - 20% ethanol
 - A competitive inhibitor of alcohol dehydrogenase
 - Less effective than 4-MP in dogs but is useful within 4-8 hours of ingestion
 - Given every 6 hours for 5-6 treatments
 - Requires close monitoring, can cause worsening of acidosis and diuresis, as well as respiratory and CNS depression
 - Symptomatic therapy
 - GI protectants
 - IV fluids
 - Diuretics (mannitol, furosemide) in oliguric patients
 - Consider hemodialysis or peritoneal dialysis

- Prognosis is good if specific therapy is started within 4-8 hours but is guarded if azotemia is present and grave if oliguria/anuria is present without long-term dialysis treatments

Household Cleaners

- Acids and alkalis cause severe caustic or corrosive lesions respectively
- Fortunately, most exposures occur after products are diluted
- For non-dilute ingestions
 - Lesions from acids appear immediately as burns affecting mouth, esophagus and stomach
 - Lesions from alkali may appear in 8-12 hours
- Treatment
 - Administer dilute milk or water
 - Administer GI protectants for several days
 - Monitor for esophageal and/or gastric ulcerations, esophageal strictures possible
 - **DO NOT INDUCE VOMITING**
 - This will further damage esophagus
 - Do not administer activated charcoal
 - Does not bind acids and alkalis
 - Can contact animal poison control for specific recommendations based on product ingested

Painting and Varnishing Products

- Most household paints and varnishes are fairly non-toxic if ingested causing only mild GI upset
- Paint from fur should not be removed with paint thinners or turpentine which are very irritating and painful when contacting the skin and foot pads
- If paint thinners are ingested, administer milk or water and **DO NOT INDUCE VOMITING** due to risk of aspiration pneumonia

Moldy Garbage Intoxication (Garbage Gut)

- Ingestion of moldy food containing **penitrem A**, neurotoxicant produced by *Aspergillus* spp.
 - Toxin raises resting membrane potential, thereby facilitating depolarization
- Clinical signs
 - Panting, restlessness, hypersalivation
 - Incoordination and **fine motor tremors**
 - Can progress to tonic spasms, hyperthermia, ataxia and seizures
- Diagnosis
 - Largely based on history, clinical signs and physical exam
 - Vomiting up large amounts of garbage
- Treatment
 - Gastrointestinal decontamination
 - Induction of emesis as long as not recumbent, neurologically compromised
 - Activated charcoal may be of benefit
 - Supportive care
 - Muscle tremors treated with methocarbamol (Robaxin)
 - Symptomatic treatment of seizures (diazepam, phenobarbital)
 - GI protectants (H2 blocker, sucralfate)

