ASPCA answers questions about antifreeze poisoning

The ASPCA Animal Poison Control Center would like to remind the veterinary community: Early diagnosis and aggressive treatment is key to treating antifreeze toxicoses! The following information answers frequently asked questions about antifreeze poisoning in dogs and cats.

1. **What types of products are used as antifreeze?** The three common ingredients used in "antifreeze" products include methanol, propylene glycol and ethylene glycol. Ethylene glycol is the most common and the most dangerous form of antifreeze to pets. When dealing with antifreeze exposures, it is important to check container labels for ingredients and concentrations.

2. **How dangerous is methanol containing antifreeze?** Methanol, also known as methyl alcohol or wood alcohol, is found most commonly in "antifreeze" windshield washer fluid. The concentration ranges from 20-100%. In humans and some non-human primates, methanol is highly toxic and ingestion of small amounts can result in injury to the retina and central nervous system. However, methanol is not usually an issue in non-human primates. The minimum toxic dose in dogs is 8.0 g/kg but is not established in cats.

3. **How dangerous is propylene glycol containing antifreeze?** Propylene glycol is the main ingredient in "safer" forms of engine antifreeze and is considered to be approximately 3 times less toxic in dogs than ethylene glycol. Automotive antifreeze solutions containing 50% or more propylene glycol are "safer" than ethylene glycol-based antifreezes because it will not cause the serious kidney damage that is seen with ethylene glycol toxicosis. However, it is important to remember that ingestion of propylene glycol-containing antifreezes may result in serious intoxication similar to that seen with other types of alcohol, such as ethanol.

4. **How dangerous is ethylene glycol containing antifreeze exposure?** Ethylene glycol is the most common and the most dangerous form of antifreeze. Ethylene glycol can cause metabolic acidosis and acute renal tubular necrosis. Most commercial antifreeze products contain between 95-97% ethylene glycol. Although the minimum lethal dose of undiluted ethylene glycol antifreeze is 4.4-6.6ml/kg in dogs and 1.4ml/kg in cats, reliable minimum toxic doses of ethylene glycol have not been established. Therefore, any suspected oral exposure to ethylene glycol antifreeze should be considered a potential toxicosis and steps should be taken determine the extent of the exposure.

5. **How do you test for ethylene glycol toxicosis?** Ethylene glycol levels can checked as early as 30 minutes post ingestion for up to 12 hours. Peak levels of ethylene glycol are reached within 1-4 hours post ingestion. There is one commercial ethylene glycol test for veterinary use (EGTTM kit by PRN Pharmacal--http://www.prnpharmacal.com ). The kit is labeled for dogs and detects a level greater than 50 mg/dl. Since cats are more sensitive than dogs,
the kit may not be sensitive enough to diagnose a toxicosis in the cat. Some human labs may run STAT quantitative ethylene glycol analysis to detect levels and could be considered with feline exposures or as an alternative to the in house test kit. Levels greater than 50 mg/kg in dogs and any detectable level in a cat would necessitate treatment.

6. What can cause false-positive ethylene glycol kit test results? False positive ethylene glycol test kit results can occur from formaldehyde or from propylene glycol (in some types of activated charcoal solutions and also from some injection solutions such as pentobarbital and diazepam.) To avoid false positive results, it is recommended to take samples for test analysis BEFORE administering activated charcoal or intravenous medications containing propylene glycol. Ethanol, methanol, or isopropyl alcohol will not interfere with test results.

7. What is recommended for treatment for ethylene glycol toxicosis? Fomepizole (Antizol Vet® by Orphan Medical-- http://www.orphanmedical.com) is considered the preferred treatment for treating ethylene glycol toxicoses in dogs. Fomepizole is given to dogs IV over a 36-hour period. The initial dose is 20 mg/kg (slow IV over 15-30 minutes), then 15mg/kg (slow IV) at 12 and 24 hours, and then 5mg/kg is given at 36 hours. Fomepizole is not recommended in cats.

Ethanol can be used in cats and dogs, however it does have several unfavorable side effects, which include CNS depression, hyperosmolality and metabolic acidosis. The preferred treatment regime is to administer 8.6 mg/kg of a 7% ethanol solution and then maintain at 100 mg/kg/hour, up to 200 mg/kg/hr as a constant rate infusion. Another method of ethylene glycol treatment is to make a 20% ethanol solution. Dogs are given 5.5 ml/kg every 4 hours for 5 treatments then every 6 hours for 4 treatments. Cats are given 5.0 ml/kg every 6 hours for 5 treatments, then every 8 hours for 4 treatments.

Other essential components of therapy include fluid diuresis, correction of acidosis and good supportive care. Peritoneal dialysis should be considered with anuric animals. Prognosis is good to guarded with aggressive treatment that is initiated within 8 hours post ingestion.

How can we help prevent antifreeze poisoning? You can help spread the word about antifreeze safety by educating your clients. The following information can be used in client education materials and on your clinic's website. To download a display copy, please visit our website: www.apcc.aspca.org.

The ASPCA Animal Poison Control Center is sending a coast-to-coast alert to pet owners about preventing accidental ingestion of antifreeze/engine coolant. According to a study published by the Center, most cases of antifreeze poisonings occur around the pet's own home and are usually due to improper storage or disposal. The ASPCA Animal Poison Control Center wants to educate vehicle owners on the safe use, storage and disposal of such products to help prevent accidental ingestion.

**Antifreeze Safety Tips**

- Always clean up antifreeze spills immediately.
- Check your car regularly for leaks.
- Always store antifreeze containers in clearly marked sealed containers and in areas that are inaccessible to your pets.
• **Never allow your pets to have access to the area when you are draining radiator fluid from your car.**

Propylene glycol containing products are relatively less toxic form of antifreeze and should be used instead of conventional ethylene glycol antifreeze. If you suspect your pet has ingested antifreeze or engine coolant, contact your veterinarian or the ASPCA Animal Poison Control Center at 1-888-426-4435 immediately.