Issue #21

Welcome to the Veterinary Lifeline Partner Program newsletter, brought to you by the ASPCA Animal Poison Control Center.

2008 Fee Increase

Beginning January 1, 2008, the ASPCA Animal Poison Control Center will be increasing the fee for a consultation by $5 per case. Individual credit cards will then be charged $60, while VLPP clinic credit cards on file will be charged $55, reflecting the $5 discount that VLPP clinics receive. Billing (individual and VLPP) will likewise increase by $5.

Who's New on the APCC Hotline?

Please join us in welcoming our four newest veterinarians: Dr. Leigh Gass, Dr. Colette Wegenast, Dr. Colleen Almgren and Dr. Donna Mensching, who just completed her toxicology residency at the University of Illinois. Their experience and knowledge base will be a great asset to our hotline.

Did You Know?

With Halloween and the holiday season rapidly approaching, it's time to remind your clients about the hazards of candies, especially chocolate, to pets. Refresh your knowledge by perusing the Toxicology Brief on Chocolate Intoxication available on our website.

And Did You Know?

Starting in 2008, the ASPCA Animal Poison Control Center will be providing online continuing education programs that you can attend at your leisure. Take and submit the exam at the end, and you'll be provided with a certificate of your approved CE. Stay tuned to our website and future VLPP newsletters for more information.

Fall Hazards for Pets

Low Toxicity: (may cause gastrointestinal upset, but unlikely to cause serious problems unless very large amounts are ingested)

- Glow jewelry, glow sticks (can cause intense taste reaction)
- School glues, epoxy glues
- Pencils
- Magic markers
- Charcoal briquettes
- Mosquito Dunks containing Bacillus thuringenesis

Moderate toxicity: (may cause significant signs beyond mild gastrointestinal upset)

- Expandable wood glues (e.g. Elmer's ProBond, Gorilla Glue—even small amounts can form large gastric foreign bodies requiring surgical removal)
- Liquid potpourri
- Batteries
- Charcoal lighter fluid
- DEET

High toxicity: (potential for very serious or life-threatening signs)

- Antifreeze/coolants
- Chocolate
- Rodenticides
- Human medications (cold and flu medications, decongestants)
- Alcoholic beverages
- Homemade "play-dough" (high sodium content)

Useful Websites for the Season

Poison prevention for pet owners: Refer clients to the ASPCA website to read about proper use of flea products, poisonous plants to watch out for (find lists of toxic and non-toxic plants, and 10 most common poisonous plants), and tips for making their homes "poison proof" for their pets.

Practice Tips— for cases where you suspect an illicit drug toxicosis, but can't confirm from the history...

There are a number of relatively inexpensive **over-the-counter** urine test kits that can be purchased at discount and drug stores that may help you rule in or out illicit drug ingestion. The tests can detect a variety of drugs, including amphetamines, cocaine, barbiturates, benzodiazepines and opiates. Some differentiate between amphetamines and methamphetamines. Some tests are single agents only, while others test for several different drugs. In general, these tests appear to be fairly accurate for most of the drugs. However, in dogs, the tests for marijuana may not be reliable, as false negatives have been reported with some OTC kits. These OTC tests may prove to be a cost-effective means of diagnosing exposures to these types of drugs.

In addition, Michigan State University offers a **convulsant screen**, which can identify a wide variety of pesticides and environmental contaminants. For further information, see the Diagnostic Center for Population and Animal Health website.

Medication Update: Naproxen

Naproxen sodium, a propionic acid derivative, is an NSAID that is structurally and pharmacologically similar to ibuprofen and ketoprofen. Some popular brand names are Aleve, Anaprox, Naprosyn, Apranax, Naprelan and Apo-naproxen. Naproxen is available over-the-counter as naproxen or naproxen sodium tablets or gel caps, ranging from 125 to 550 mg, and suspension form (125 mg/5ml). 220 mg of naproxen sodium is equivalent to

200 mg of naproxen. Similarly, 550 mg of naproxen sodium is equivalent to 500 mg of naproxen. Naproxen, not naproxen sodium, should be used for dose calculation. Equiproxen® (Fort Dodge), a formulation designed for use in horses, comes in 8 gram packets each containing 4 grams of naproxen. In addition enteric coated and delayed release formulations are available, and naproxen can also be found in combination with lansoprazole (Genpharm).

The reported therapeutic dose of naproxen for dogs is 2 mg/kg PO every other day, but due to the narrow margin of safety of naproxen and availability of approved NSAIDs for dogs, we do not recommend the use of naproxen in dogs. The dose used in rabbits, rodents and pocket pets for septic arthritis pain and inflammation is 2.4 mg/ml in drinking water for 21 days. The reported doses for horses are .5 mg/kg by slow IV, then 10 mg/kg, PO (top dressed in feed) bid for up to 14 consecutive days. (package insert; Equiproxen®-Syntex Animal Health). Cats and ferrets appear to be more sensitive to naproxen than dogs, and its use is not recommended in these species.

The pharmacokinetics of naproxen have been studied in dogs after administering the drug orally and IV. Following oral administration, absorption was rapid and maximum plasma concentration was found to be 0.5 3 hours, with bioavailability varying between 68% to 72%. The dog differs from other animal species in elimination of naproxen. In dogs, naproxen is primarily eliminated through the bile (feces), whereas in other species the primary route of elimination is kidneys. After following IV and oral administration, the average elimination half-life of naproxen was 74 hours in dogs (compare to 12 hours in humans). This long half-life in dogs is thought to be due to the extensive enterohepatic recirculation that naproxen undergoes in this species.

Because naproxen is highly bound to plasma proteins and may displace other highly bound drugs, increased activity of phenytoin, valproic acid, oral anticoagulant, other NSAIDS, salicylates, sulfonamides and sulfonylurea antidiabetic agents may occur. Other drugs that naproxen may interact with include aspirin, probenecid, methotrexate, and furosemide. In dogs, doses of 2- 10 mg/kg may result in gastrointestinal irritation or ulceration, and doses > 10 mg/kg may put dogs at risk for acute renal failure. Ingestion of any amount in a cat is considered significant, and measures to prevent GI ulceration and renal failure should be instituted in cats exposed to naproxen.

Management: If the exposure was recent, and the patient is asymptomatic, vomiting may be induced. If the patient has already vomited, antiemetics can be administered, followed by administration of activated charcoal. Because naproxen undergoes enterohepatic recirculation, dogs may benefit from multiple doses of activated charcoal, and activated charcoal may be effective for up to 48 hours post ingestion. Just be sure to monitor electrolytes when giving multidose charcoal to avoid hypernatremia issues. GI protectants should include sucralfate, famotidine or omeprazole, and possibly misoprostol, and should be administered for 10-14 days. If a dose high enough to potentially cause renal damage is ingested, fluid diuresis (2 X maintenance fluids) for 48-72 hours is recommended, along with monitoring of renal parameters.

Case Study

It's Mushroom Season Again!

It is late summer, and your client tells you that Molly, her 6 1/2-year-old, healthy spayed female fox hound ingested a mushroom while on a walk. She was able to ingest only part of it. The owner saved the part of the mushroom that Molly did not eat. She said that it was growing in a shady area near some tree roots. She brings the dog and the mushroom to the clinic right away. The mushroom remnant is small, and tannish brown in color. You glance into your already full waiting room, and the dog appears to be clinically normal.

Question 1:

Initially, what is the safest approach in this case?

a. Induce vomiting when it is Molly's turn to be seen, and send her home. Based on where it was growing, and its appearance, it is not likely one of the toxic species. Mushrooms, like many insects and birds, exhibit aposematism (their bright colors warn potential predators that they may be toxic), so since this one wasn't brightly colored, it is not likely very toxic.

b. Do not induce vomiting; perform a gastric lavage instead, give one dose of activated charcoal, and send the dog home.

c. Never induce vomiting with little brown mushrooms (LBMs), because they are notorious for causing rapid onset tremors and seizures.

d. Induce vomiting if dog is asymptomatic, give activated charcoal, and monitor in the clinic for 4 hours.

e. b and c

Answer: The answer is D.

When a positive identification cannot be made, decontamination is recommended for recent mushroom ingestions. NEVER try to identify a mushroom over the phone or based on a picture! If the patient is asymptomatic, vomiting should be induced, give at least one dose of activated charcoal, and monitor in the clinic.

Question 2:

You call the ASPCA APCC and reach Dr. Hope Lopez, who will be able to provide you with efficient and accurate information about mushrooms. Possible signs with mushroom ingestion can include which of the following?

a. CNS signs (hallucinations, tremors, seizures)
b. Muscarinic signs
c. Methemoglobinemia
d. Liver failure
e. Renal failure
f. All of the above

Answer: The answer is F

Since November 2001, the ASPCA Animal Poison Control Center has received 1422 calls on unidentified mushroom ingestion. Thirty-six percent of these cases were assessed as high or

medium suspicion that reported signs were related to the exposure. A large range of signs was seen, including vomiting, diarrhea, liver failure, acute renal failure, arrhythmias (bradycardia, tachycardia), hallucinations, methemoglobinemia, visual disturbances, dyspnea, tremors, seizures and death.

Generally, toxic mushrooms are divided into eight groups, based on toxin type. Six of these groups are of potential veterinary significance and representative members are common throughout North America. Species containing hepatotoxic cyclopeptides (Amanita, Galerina and Lepoita), especially Amanita phalloides, the death cap, are the most commonly documented cases of fatal mushroom poisoning in dogs.

There is a useful table in the peer-reviewed Toxicology Brief entitled Mushroom Poisoning in Dogs which describes mushrooms by toxin type, relevant species, and mechanisms of toxicity. A few examples of some of the relevant species listed in the table are:

Amanita phalloides: This is one of the cyclopeptide mushrooms containing amatoxin, which is hepatotoxic. A. phalloides species are found in MD, PA, DE, NJ, VA, RI, MA, CA, OR, WA. A. phalloides is less likely to be found in the Midwest, Southeast and Mountain states. They require tree roots to grow, so not often found in open grassy areas, unless near mature trees with extensive root systems. May be near but not necessarily under trees. Found in woodlands, parks and yards. Very toxic. LD50 in humans is estimated to be 0.1 mg/kg. One decent-sized cap can be fatal.

Psilocybe (liberty cap): These cause dysphoria, agitation euphoria and hallucinations. They are widespread throughout North America, especially in the Pacific Northwest. These are coprophilous. They grow on lawns, gardens, parks, roadsides, open wooded areas. Stems of some Psilocybe spp. turn blue when handled. Recreational use of these mushrooms by humans may put Psilocybe spp. in close proximity to pets.

Amanita muscaria: These cause CNS effects. Mushrooms that contain isoxazole derivatives cause fluctuating CNS excitation and depression, due to effects of muscimol (binds GABA) and ibotenic acid (acts on glutamate in the brain).

Coprine (inky cap is common name for Coprinis atramentarius): Common urban mushroom. Grow on roadsides, parks, gardens, lawns, parking lots. These are only a problem if there is a co-ingestion of another agent that inhibits alcohol dehydrogenase, such as ethanol, resulting in hyperacetaldehydemia.

Gyromitra species (false morels): These mushrooms antagonize pyridoxine (vitamin B6), an essential cofactor for the synthesis of GABA. Clinical effects include GI signs, followed by neurologic, hepatorenal and hemolytic (methemoglobinemia) syndromes. Coma and other CNS signs are usually terminal signs. These grow throughout North America, and are found primarily in the spring. They are often associated with conifers and aspens and/or melting snow banks.

Inocybe species: There is a group of mushrooms that contain muscarine (Inocybe and Clitocybe are examples). Most of these mushrooms are non-descript little brown mushrooms. Muscarine binds muscarinic (acetylcholine) receptors in the parasympathetic nervous system, and may cause hypersalivation, vomiting, lacrimation, increased bronchial secretions, bradycardia and diarrhea. Amanita muscaria contains muscarine, but its main psychoactive constituent is muscimol.

Question 3:

Based on what you know so far, what is the safest approach to management for unknown mushroom ingestion?

Answer:

If the patient is asymptomatic, induce vomiting and give one dose of activated charcoal. Multiple doses of activated charcoal may be of benefit with ingestion of a mushroom that is eliminated by enterohepatic circulation (e.g. Amanita phalloides). It is safest to monitor in the clinic for CNS and cholinergic signs. Usually, with ingestion of mushrooms containing psilocybins and muscarine, signs occur within four hours. Baseline blood work is prudent, especially if the patient is geriatric or less than 3 months old. Monitoring parameters should include liver enzymes for 72 hours, but may also include monitoring for methemoglobinemia and acute renal failure. Treatment, is symptomatic and supportive, and may include fluids and liver support. If possible, try to have the mushroom identified by an expert; local colleges or museums may have individuals who can accurately identify mushrooms.

Question 4:

Bonus question. What is the most extensively cultivated edible mushroom?

Answer:

Agaricus bisporus (aka table mushroom, cultivated mushroom or button mushroom)

Not a VLPP Member?

If you are not a member of the Veterinary Lifeline Partner Program and would like to join, please click here or call (888) 332-3651 to be prepared for any poison emergency.

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