

## Toxicology Talk



**Erin Freed, AS, CVT**  
ASPCA Animal Poison  
Control Center  
Urbana, Illinois

Erin has been employed with the ASPCA Animal Poison Control Center (APCC) since 2006. She earned her associate's degree in applied science in veterinary technology from Parkland Community College and is currently pursuing a bachelor's degree in applied science in veterinary business management from St. Petersburg College. Erin's interests include toxicology, but her true passion is sharing knowledge and educating veterinary staff. She has been an instructor for a toxicology continuing education (CE) course for the Veterinary Support Personnel Network and has spoken at several APCC CE conferences. Erin has had peer-reviewed articles published in *Veterinary Technician*, the *NAVTA Journal*, and *Veterinary Medicine* and has authored a chapter on the renal system in *Small Animal Toxicology Essentials*.

# Oral Decontamination in Dogs and Cats

**P**revention is the best way to decrease pet poisonings, but even with precautions in place, accidental poisonings happen every day. The management of poisoning cases generally consists of decontamination and symptomatic and supportive care because very few antidotes are available, and those that are available can be cost prohibitive or difficult to obtain.<sup>1</sup> Therefore, it is important to consider methods of decontamination for a poisoned patient when indicated.<sup>1</sup>

*Decontamination* is the process of removing a toxicant from a patient to reduce its absorption or enhance its elimination, thus minimizing or even preventing clinical signs from developing.<sup>2</sup> The most common types of decontamination are oral, inhalation, dermal, and ocular.<sup>1,2</sup>

This article specifically addresses oral decontamination in dogs and cats, including potential adverse reactions and contraindications. Oral decontamination is the process of removing a toxicant from the gastrointestinal (GI) tract through oral rinsing; dilution; induction of emesis; lavage; the use of absorbents, cathartics, and enemas; or endoscopy or gastrotomy.<sup>1,2</sup> Before proceeding with oral decontamination, veterinary technicians should consider the following guidelines:

- If the patient is stressed or symptomatic, it should be stabilized first and then decontaminated if necessary.<sup>1</sup>
- Each poisoning case varies depending on the patient's species, breed, age, weight, and health history; agent(s) involved; amount ingested; and duration of exposure.<sup>2</sup>
- Decontamination is not required for all poison exposures.

### ORAL RINSING

Oral rinsing is the process of flushing the mouth with water to remove or decrease the amount of toxin ingested or absorbed through the mucous membranes (e.g., a dog that has bitten a toad), thus reducing systemic toxicity. Depending on the toxin, the mouth should be rinsed with tepid water for at least 5 to 10 minutes. The mouth can be flushed using a garden hose, a rinse attachment for a sink, or a detachable shower nozzle. It is best not to squirt the water directly into the back of the throat because of the risk for aspiration. The water source should be positioned at the commissure of the lips and directed rostrally. Preventing a pet from drinking water entering the mouth is impossible, so as long as most of the water runs out of the pet's mouth and onto the ground, oral rinsing is achieved. Oral rinsing is also used when a patient has developed a taste reaction after licking a product such as a topical insecticide. Offering a small amount of water, milk, canned food, or juice drained from canned tuna or chicken helps rinse a bad taste out of the patient's mouth.

Decontamination is the process of removing a toxicant from a patient to reduce its absorption or enhance its elimination, thus minimizing or even preventing clinical signs from developing.

**Contraindications.** Oral rinsing should not be performed in an animal that cannot swallow or that is unstable (e.g., experiencing tremors, seizures, or dyspnea; obtunded; recumbent), unless an endotracheal tube is in place to prevent aspiration.

### DILUTION

Dilution is indicated when an irritating or corrosive substance such as a cationic detergent (e.g., fabric softeners, potpourri oils), acid, or alkali (e.g., cleaners) has been ingested. Offering a demulcent, such as milk or plain yogurt, can soothe and relieve irritation of the mucous membranes; demulcents form a protective film in the mouth.<sup>2</sup>



shutterstock.com/Robert Crum

**MANY DOGS VIEW TOADS AS PREY** and catch them in their mouths. All toads can secrete a toxic chemical that is absorbed through the mucous membranes in a dog's mouth. Some toads, such as the Colorado River (*Bufo alvarius*) and cane toads (*Bufo marinus*), secrete toxins that are more potent and pose a higher risk for systemic signs. A dog that has bitten a toad will require oral rinsing.

Administering too much diluent can cause the stomach to distend or lead to vomiting, which can reexpose the esophagus to the corrosive material and potentially cause aspiration.<sup>1,2</sup> A general rule to follow when recommending diluents to dogs and cats is use a volume similar to that recommended for hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) in dogs (1 mL/lb).<sup>2</sup> Clients who are not medically trained may feel that more is better, so when speaking to clients, it is important to recommend a specific diluent and amount to administer.

**Contraindications.** A diluent should not be offered to a patient that is vomiting, has an increased risk for aspiration (e.g., cannot swallow or control airway; is brachycephalic), or is unstable (as described above).<sup>1,2</sup>

### INDUCING EMESIS

Emesis is the process of removing a substance from the stomach through vomiting. It is generally most effective within 30 to 90 minutes after ingestion, but this time frame depends on the substance ingested (e.g., rapid-release versus time-released medications).<sup>2,3</sup> Some toxins act extremely fast and the onset of signs can develop minutes after exposure, making emesis contraindicated.<sup>2,3</sup> H<sub>2</sub>O<sub>2</sub>, apomorphine, xylazine, and dexmedetomidine are emetics commonly used in veterinary medicine.<sup>1</sup>

Whether at home or in the clinic, it is best to have the pet vomit in an area that is well lit and easy to clean, such as tile, wood, or concrete flooring. According to one study, approximately 49% (range, 9%–75%) of gastric contents were recovered when emesis was induced in dogs within 30 minutes of a toxin ingestion and approximately 17% to 62% of gastric contents were recovered when emesis was induced within 1 hour of a toxin ingestion.<sup>3,4</sup>

It is important to note the number of times the pet vomits, the amount of toxic substance, and the presence of food, bile, blood, or other foreign material. The vomit should be cleaned up immediately to prevent reexposure. Once the pet has vomited, it is best not to allow it to drink any water or eat any food (NPO) for at least 30 minutes for small and young animals and up to 2 hours for larger adults.<sup>5</sup> If NPO does not control the vomiting, an antiemetic (maropitant, 1 mg/kg SC [not labeled for cats]; ondansetron, 0.1–0.2 mg/kg SC, IM, or IV; or metoclopramide, 0.2–0.5 mg/kg SC or IM) can be administered.<sup>3</sup>

Emetics that should be avoided include salt and baking soda (sodium bicarbonate) because of the risk of increasing the sodium level in the body (hypernatremia).<sup>2–4</sup> Hypernatremia can lead to central nervous system (CNS) signs such as ataxia, tremors, and seizures, which can put the patient more at risk.<sup>2–4</sup> Dish soap is not recommended because of the risk for aspiration pneumonia and severe

## The most common types of decontamination are oral, inhalation, dermal, and ocular.

respiratory effects if the pet inhales the soapy bubbles.<sup>2</sup> Washing soda crystals (sodium carbonate) are used in the United Kingdom and Australia to induce emesis,<sup>9</sup> but this practice should be avoided because the crystals are caustic. Syrup of ipecac was removed from the market and is no longer recommended because vomiting can be delayed up to 40 minutes and it has been reported to cause cardiac issues in humans.<sup>2,3</sup> Powdered mustard should be avoided because it can be irritating to the GI tract and is generally not effective.<sup>2</sup>

### Dogs

Emesis can be performed by veterinary staff or the client at home using fresh (bubbly and nonexpired) 3% H<sub>2</sub>O<sub>2</sub>.<sup>1,2</sup> H<sub>2</sub>O<sub>2</sub> is the safest over-the-counter emetic; it works by bubbling against the stomach lining, which causes local irritation, and producing oxygen, which stretches the stomach.<sup>1,2</sup> If the patient does not vomit, the H<sub>2</sub>O<sub>2</sub> simply breaks down into water and oxygen while it is foaming.<sup>2</sup> Before recommending emesis to a client, ask about the pet's clinical signs, take a brief toxicology history, and consult with a veterinarian.<sup>3</sup>

All emetics are more effective if the patient eats a small meal first.<sup>1,2</sup> The recommended dose for H<sub>2</sub>O<sub>2</sub> is 1 mL/lb body weight but should not exceed 45 to 50 mL, even if the patient exceeds 100 lb.<sup>1-3</sup> H<sub>2</sub>O<sub>2</sub> can be administered directly with a medicine dropper or turkey baster, or it can be mixed with milk, peanut butter that does not contain xylitol, or low-sodium chicken or beef broth to entice voluntary ingestion.<sup>1</sup> Emesis may be unsuccessful if the product used to entice ingestion exceeds the recommended amount of H<sub>2</sub>O<sub>2</sub>, thereby watering it down. Vomiting usually occurs within 10 to 15 minutes, and the dose can be repeated once if emesis is not initially successful.<sup>1,5</sup> Light activity between doses increases the effectiveness of H<sub>2</sub>O<sub>2</sub>.<sup>1,5</sup> Adverse effects such as protracted vomiting, gastritis, and hematemesis are generally the results of overdosing.<sup>2,5</sup>

If the patient does not vomit within 30 minutes after the administration of H<sub>2</sub>O<sub>2</sub>, emesis can be induced with another emetic such as apomorphine. Emesis should be attempted again only if the patient is asymptomatic and the timeframe for emesis is appropriate for the toxin ingested. Apomorphine can be a first-choice emetic in dogs that are in the clinic or if H<sub>2</sub>O<sub>2</sub> is unavailable. Apomorphine is a centrally acting emetic that stimulates the dopaminergic receptors in the chemoreceptor trigger zone (CRTZ).<sup>1,3,4</sup> It can be administered by the IV, IM, or conjunctival route.<sup>1,3,4</sup> The recommended dosage for IV and IM routes is 0.02–0.04 mg/kg.<sup>3,5</sup> Emesis occurs almost

immediately after IV injection and usually within 5 minutes after IM injection.<sup>1</sup> For conjunctival administration, a portion of an apomorphine tablet can be crushed and dissolved in a few drops of saline.<sup>1,3,4</sup> Emesis generally occurs within 4 to 6 minutes; once the patient vomits, the conjunctival sac should be flushed with saline to prevent protracted vomiting.<sup>1-3</sup> Adverse effects include CNS and respiratory depression, protracted vomiting, and, rarely, CNS stimulation.<sup>1,3,4</sup> Naloxone can be used to reverse the CNS and respiratory effects of apomorphine but will not block the emetic effect.<sup>1,3,4</sup>

### Cats

Vomiting is difficult to induce in cats, but xylazine, an alpha<sub>2</sub>-adrenergic agonist, can be used for emesis induction in this species.<sup>1,3,4</sup> The recommended dose is 0.44 to 1 mg/kg IM or SC, and emesis generally occurs within 5 minutes.<sup>3,4</sup> Adverse effects can include CNS and respiratory depression, hypotension, and bradycardia.<sup>1</sup> These effects, along with the emetic effects, can be reversed with yohimbine, an alpha<sub>2</sub>-antagonist, at 0.1 mg/kg IM, SC, or IV.<sup>1,3-5</sup> Dexmedetomidine, an alpha<sub>2</sub>-receptor-specific agent, can also be used as an effective emetic in cats.<sup>4,5</sup> The recommended dose is 7 mcg/kg IM (median dosage, 0.96–10 mcg/kg) and 3.5 mcg/kg IV.<sup>6,7</sup> Sedative and emetic effects can be reversed with an equal volume of atipamezole given via the same route as the dexmedetomidine.<sup>4,5</sup>

H<sub>2</sub>O<sub>2</sub> is not recommended in cats because they are more likely to develop gastritis.<sup>3</sup> Because cats' CRTZ receptors differ from those of dogs, apomorphine is poorly effective as an emetic and may also result in CNS stimulation.<sup>3,5</sup>

### Contraindications

Emesis should not be induced in a patient that is already vomiting or exhibiting clinical signs such as agitation, disorientation, ataxia, obtundation, dyspnea, seizures, recumbency, or coma.<sup>1,2,4,5</sup> If the patient is symptomatic, the poison has taken effect and decontamination is inappropriate and can cause further complications (e.g., aspiration pneumonia).<sup>1-5</sup> In patients with preexisting health conditions, such as seizures, cardiovascular disorders, recent abdominal surgery, megaesophagus, or collapsing trachea, and in

<sup>9</sup> Wismer T, DVM, DABVT, DABT, MS. Personal communication. 2016.

● **TECHPOINT** ●

During decontamination procedures, veterinary technicians should remember to use proper safety measures and wear personal protective equipment such as gloves, an apron, and goggles.

brachycephalic breeds with known breathing issues, emesis should be induced only under the supervision of a veterinarian because these conditions can make vomiting hazardous.<sup>1-5</sup> The veterinarian must weigh the benefits of emesis against the risks.<sup>1</sup> Emesis should not be induced in patients that have ingested a strong alkali, acid, or other highly corrosive material.<sup>1-5</sup> Emesis with these agents can reexpose the mouth and esophagus, which can lead to ulceration, perforation, and scarring.<sup>1-5</sup> Emesis should not be induced if the patient has ingested hydrocarbons or petroleum distillates (e.g., kerosene, paint thinner, solvents, lighter fluid) because these agents are easily aspirated into the lungs.<sup>1-5</sup> Extreme caution should be taken when emesis is induced in a patient that has ingested zinc phosphide (e.g., rodenticides).<sup>2</sup> In these cases, emesis should be performed in a well-ventilated area or outside because of the emission of phosphine gas, which is also toxic to humans.<sup>2</sup>

### GASTRIC LAVAGE

Gastric lavage is used to remove ingested toxins from the stomach by irrigation and may be necessary if emesis is unsuccessful or contraindicated.<sup>1,3-5</sup> Gastric lavage can be considered in symptomatic patients that are extremely sedate, unconscious, recumbent, or seizing or that have other health concerns, such as a recent abdominal surgery, that increase the risk associated with emesis induction.<sup>1,3</sup> Gastric lavage can also be considered when the patient has ingested material that is large in size (but not larger than the diameter of the lavage tube) or has formed a concretion in the stomach (e.g., iron tablets or large amounts of chocolate) or capsules/tablets approaching a lethal dose (e.g., calcium channel blockers, beta-blockers, baclofen, organophosphate and carbamate insecticides).<sup>3,4</sup>

During lavage, the patient should be anesthetized unless comatose, and a cuffed endotracheal tube should be placed to protect the airway and prevent aspiration.<sup>1,3,4</sup> A large-bore gastric tube with a fenestrated end should be lubricated and inserted into the stomach no farther caudal than the xiphoid process.<sup>1,3-5</sup> Body-temperature water (5–10 mL/kg) should be instilled using the gravity method, and the flushing process should be repeated multiple times with copious amounts of water until the lavage fluid runs clear.<sup>1,3,4</sup> The patient's head should be kept lower than the chest and the gravity method used for fluid recovery.<sup>1,3,4</sup> The contents should be emptied into a bucket and examined for evidence of the toxic substance.<sup>3</sup>

Activated charcoal (AC) can be instilled directly into the stomach after gastric lavage has been completed.<sup>3</sup> The free end of the tube should be kinked before being removed to help prevent aspiration.<sup>1,3,4</sup> Adverse effects with gastric lavage include mechanical injury to the mouth, throat, esophagus, or stomach; hypothermia; and the instillation of fluid into the lungs.<sup>1,3-5</sup>

**Contraindications.** Contraindications include ingestion of corrosive substances, because of the risk for esophageal or gastric perforation from the tube placement; hydrocarbons, because of the risk for aspiration; and sharp objects.<sup>1,3,4</sup>

### ACTIVATED CHARCOAL

AC is an absorbent that binds to most organic compounds, reduces their absorption into the systemic circulation, and facilitates their excretion in the feces.<sup>1,2</sup> AC is beneficial when emesis cannot be induced and for toxins that undergo enterohepatic recirculation. AC comes in powder, gel, and liquid formulations; the recommended dose is 1–3 g/kg.<sup>1,2,5</sup> Tablets and capsules found in stores are not likely to be as effective as commercially prepared medical products.<sup>1,3,4</sup> AC can be administered orally with a large syringe or a stomach tube while the animal is anesthetized and an endotracheal tube is in place to prevent aspiration.<sup>1,3,5</sup> AC can also be mixed with a small amount of canned food to make it palatable for voluntary ingestion, but this does slightly decrease its effectiveness.<sup>1,2</sup> Repeated doses can be given every 4 to 8 hours at half the original dose when enterohepatic recirculation is known to occur.<sup>1,2</sup> Additional doses should not contain a cathartic because of the increased risk for dehydration via fluid loss from the GI tract.<sup>3</sup> Adverse effects include vomiting, hypernatremia, and aspiration.<sup>1-5</sup> The use of antiemetics should be considered before administering AC, especially if the patient is vomiting from induction of emesis.<sup>3</sup> Patients should be monitored for evidence of aspiration and hypernatremia for at least 4 hours after administration of AC.<sup>1,4,5</sup>

**Contraindications.** AC should not be administered to patients that are actively vomiting or that have ingested a caustic material, hydrocarbons, or agents that are known to have excess sodium (sodium bicarbonate, Play-Doh) or that are osmotically active (gummy candies, artificial sweeteners, paintballs, glycerol).<sup>1,4,5</sup> AC does not bind to all compounds equally, so it should not be administered to patients that have ingested heavy metals, xylitol, ethanol, or fertilizers.<sup>1,3,5</sup>

### CATHARTICS

Cathartics enhance the elimination of a substance by increasing the speed and transit time of the GI tract.<sup>1-3</sup> The three types of cathartics used in dogs and cats are bulk, osmotic, and saline cathartics.<sup>1,2</sup> Bulk cathartics use a high fiber content to retain water and produce bulkier stools.<sup>1,2</sup> Common bulk cathartics include psyllium (Metamucil [no flavors or artificial sweeteners]), plain canned pumpkin (no spices or sweeteners), and whole-wheat bread (no nuts or raisins).<sup>1,2</sup> Osmotic cathartics pull electrolyte-free water into the GI tract, which increases the fluid volume, stimulating GI motility.<sup>1,2</sup> A saccharide osmotic cathartic such as sorbitol is commonly combined with AC. Sorbitol can be given at 1–2 mg/kg using a 70% solution.<sup>1,3</sup> Adverse effects from sorbitol include vomiting, dehydration, secondary hypernatremia, abdominal cramping or pain, and possibly hypotension.<sup>3,4</sup> Saline cathartics draw fluid into the intestines through osmosis, which increases the fluid content of feces, thus causing intestinal distention and promoting peristalsis.<sup>4</sup> Saline cathartics, such as sodium sulfate (Glauber's salts) and magnesium sulfate (Epsom salts), can be given at 250 mg/kg.<sup>1,2,4</sup> The use of magnesium sulfate has led to hypermagnesemia in some cases, which presents as CNS and cardiovascular depression.<sup>1</sup> Electrolytes should be monitored very closely for any disturbances with the administration of saccharide and saline cathartics because fluid shifts can occur.<sup>1-3</sup>

**Contraindications.** Cathartics should not be administered to patients with diarrhea, dehydration, electrolyte imbalances, ileus, or intestinal obstruction or perforation.<sup>1-3,4</sup> Saline cathartics should not be administered to patients with renal insufficiency.<sup>1</sup> Mineral oil is no longer recommended as a lubricant cathartic in dogs and cats because it has a higher risk of pulmonary aspiration.<sup>3,4</sup> The use of cathartics alone in the management of a poisoned pet is no longer recommended or beneficial.<sup>3,4</sup>

### ENEMAS

Enemas are helpful when elimination of toxicants from the lower GI tract is desired (e.g., raisins, extended-release medications).<sup>1,2</sup> Warm water or warm soapy water at 10 mL/lb and dioctyl sodium sulfosuccinate (DSS)

Clients should be educated about poison prevention, and the clinic should establish a pet poisoning protocol so the veterinary team knows how to proceed with decontamination when clients call or present a poisoned patient for treatment.

single-use syringes (250 mg/12 mL; dogs and cats) are enemas that can be used to move medication and other toxins quickly through the colon and lessen additional systemic effects.<sup>1,2,8</sup> Phosphate enemas should be avoided (especially in cats) because of the risk for electrolyte and acid–base disturbances.<sup>1,2</sup> Enemas should not be administered to patients with diarrhea.<sup>5</sup>

### ENDOSCOPY AND GASTROTOMY

Endoscopy requires general anesthesia and a thin flexible endoscope to remove coins, batteries, toys, and other items before they can pass out of the stomach.<sup>1,2</sup> If endoscopy is not available, the objects can be removed by gastrotomy. Gastrotomy is a surgical procedure to remove objects from the stomach that are corrosive (e.g., batteries), form bezoars (e.g., iron tablets), expand and cause a foreign body obstruction (e.g., Gorilla glue), or continue to seep their toxic effect into the body (e.g., zinc pennies, fentanyl or nicotine patches).<sup>1,3,4</sup>

**Contraindications.** Surgery should not be performed until the patient is stabilized. Before anesthesia, emesis should be controlled with antiemetics, the patient should be properly volume resuscitated with IV fluids, and electrolyte, glucose, or acid–base imbalances should be corrected.<sup>3</sup> Before surgery, radiographs should be obtained to verify the presence of the agent or a foreign body obstruction; however, not all agents are radiopaque.<sup>3</sup>

*continued on page 42*

<sup>b</sup>Wegenast C, DVM, CVCT; Cripe E, DVM, CVCT; DeClementi C, VMD, DABT, DABVT. ASPCA Animal Poison Control Center. Personal communication. 2016. ASPCA.