Dermal, Ocular, and Inhalation Decontamination in Dogs and Cats

Prevention is the best way to decrease the incidence of 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. Therefore, it is important to consider methods to decontaminate a poisoned pet when indicated.

Decontamination is the process of removing a toxicant to reduce its absorption or enhance its elimination, thus minimizing clinical signs or even preventing them from developing. The most common methods of decontamination in pets are oral, dermal, ocular, and inhalation. This article specifically addresses dermal, ocular, and inhalation decontamination in dogs and cats, including potential contraindications and precautions. For information on oral decontamination, please refer to “Oral Decontamination in Dogs and Cats” in the November/December 2016 issue.

BOX 1 lists the key points to remember when managing poisoned pets.

DERMAL DECONTAMINATION

Dermal exposures can involve a variety of agents, including greasy and oily substances, sticky materials, irritating or corrosive products, dry substances, and skunk spray. Dermal exposures can also happen when an owner applies drops, sprays, ointments, or other substances directly to the pet. The goals of dermal decontamination are to prevent transdermal absorption and oral reexposure from the pet grooming itself.

Dermal decontamination involves removing a substance from the fur and skin without using any harsh chemicals or solvents, which can further irritate and damage the skin. Bathing is generally the best technique for removing substances from the fur and skin, but a dermal decontamination plan should be designed based on the nature and amount of the substance, duration of exposure, the number of substances involved, and the pet’s condition, signalment, and species.

Veterinary staff should be aware of the public health risks associated with certain toxicants. Dermal decontamination should take place in a well-ventilated area, and personal protective equipment (PPE), such as protective clothing (eg, impermeable gloves and apron), protective eyewear (eg, goggles, face shield), and respiratory protection (eg, surgical mask), should be worn to avoid human exposure. Although the PPE needed will...

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depend on the substances involved, it is important to remember that certain agents, such as pepper spray, organophosphate insecticides, zinc/aluminum phosphide rodenticides, and irritating/corrosive substances, can pose a risk to veterinary staff. Be sure to remove contaminated items from the animal as well as items used in transport (eg, collar, towels, blankets). Pets should not ingest substances used in dermal decontamination (eg, soap, oils, skunk-off mixture) because they can cause gastrointestinal upset.

**Greasy and Oily Substances**

Greasy and oily substances include herbicides, topical spot-on insecticides, glow sticks, and essential oils. To remove a greasy or oily substance, bathe the pet with a liquid dishwashing soap used for hand-washing dishes. Towel-dry the pet and keep it in a warm environment.

**Sticky Substances**

Sticky substances can include tar, asphalt, sap, oil-based paint, glue, wax, and insect glue traps. To remove a sticky substance from the fur, the sticky bond must be softened. Oils such as butter/margarine,
vegetable/olive oil, peanut butter, or mineral oil can be applied and worked into the fur.1,2,4,5 The sticky substance generally dissolves into pliable, gummy balls that can be combed or picked out using your fingers.1,4 Some substances may require the oil to sit on the fur for 5 minutes.5 Once the sticky substance is removed, the oil can be washed off using liquid dishwashing soap.1,2,4,5 Insect and rodent glue traps can be removed using the same method, but also apply baby powder, cornstarch, or paper towels to any remaining sticky areas on the traps to prevent further attachment to the fur or skin.4

Substances such as super glue or paint may not come off with appropriate dermal decontamination. Once dry, these substances pose a low risk for toxicosis and can be allowed to wear off naturally.3 Leaving the substance on the fur may concern some owners, in which cases the fur may be clipped or shaved.4 Clipping and shaving may also be necessary for long-haired pets or pets that cannot be bathed.1–3,5,7

Cautions and Contraindications. Do not use harsh chemicals or solvents (eg, paint thinner, acetone) to remove sticky substances from the fur because these products can be irritating and damaging to the skin.4

Irritating or Corrosive Substances
Irritating or corrosive substances can include fabric softener from unused sheets, liquid potpourri, electric dishwashing detergents, drain and oven cleaners, mineral spirits, and gasoline.1,2,4 To remove such substances, gently flush the pet’s fur and skin with copious amounts of water for 15 to 20 minutes.3,6,7

Cautions and Contraindications. Avoid any abrasive scrubbing or high-pressure sprays that may further traumatize the skin.3,6,7 Do not use neutralizing agents on the skin (eg, applying an acid on an alkaline substance) as doing so may result in a chemical reaction that further damages the skin.3,6

Dry Substances
Dry substances can include powders, dust, and granules.2 To remove these, the fur can be brushed or vacuumed before bathing with a mild liquid dishwashing soap.2,5 Vacuuming should take place in a well-ventilated area or outdoors.4 Some dry products may become clumped or sticky when water is added.2

Skunk Spray
Skunk spray contains thiols that are responsible for the foul odor.10 Thiols are not water soluble and are difficult to remove, even with soap.10 To decrease the odor, the thiols must be converted into compounds that have little to no odor using a skunk-off mixture of 1 quart 3% hydrogen peroxide, ¼ cup baking soda, and 1 to 2 teaspoons liquid dishwashing soap.4,8,10 The baking soda catalyzes the oxidative ability of the peroxide, which then oxidizes the thiols into highly water-soluble sulfonates (sulfonic acid).10 For large dogs, 1 quart of water can be added to the skunk-off mixture to ensure complete coverage.10

Wet the pet thoroughly, apply the mixture, and work it into the fur.4,8 Allow the skunk-off mixture to sit on the fur for 5 minutes and then rinse thoroughly.4,8 This procedure can be repeated as needed. A bleaching effect may be noted on clothes, carpets, towels, and the pet’s fur.6,10 Because the skunk-off mixture produces oxygen gas, bathe the pet in a well-ventilated area away from heat sources and open flames.4,8,10 Discard all unused mixture and do not store it in a closed container.10

Ocular Decontamination
The goals of ocular decontamination are to remove substances from the eyes and reduce ocular tissue damage.5 Ocular exposures can occur with solids, liquids, or gases.2 Substances can enter the eyes accidentally or intentionally through splashes, immersions, or instillations.2 Any substance not specifically formulated for the eyes can cause irritation, corneal abrasions or ulcerations, and blindness.1–3,5

To remove a substance, the eyes should be flushed for at least 20 to 30 minutes using sterile saline or tepid water.1–3,6–8 Eye flushing can be done using a bottle of sterile saline, a clean syringe without the needle, or an eye dropper.1,2,5,9 If these items are unavailable, use a clean washcloth or cotton ball to soak up and squeeze the flushing solution into the eyes. A small paper/plastic cup or a water bottle can also be used to rinse the eyes.1,5 Hold the item (eg, dropper, cotton ball, cup) as close to the eye as possible, without touching the surface, and allow the saline or water to flow across the eye in a slow, steady stream.1 Flushing can be repeated with periods of rest for the pet and owner between flushings.1,5,9 Any time an ocular exposure happens, it is best to follow up with an examination and fluorescein dye test to check for corneal damage.1–3,5

Cautions and Contraindications. High-pressure spray devices (eg, detachable sink rinse or shower head) should not be used because the pressure is too high and may cause additional irritation or pain. Neutralizing agents, decongestant allergy eye drops, or redness relief eye drops (eg, Visine) should not be used to rinse a pet’s eyes.6,8 Ocular chemical burns are generally treated with lubricated ointments, but corticosteroid ointments should be used only if the corneal epithelium is intact.8 To prevent further injury to the eyes, do not allow the pet to rub or scratch the eyes.3

Inhalation Decontamination
The goal of inhalation decontamination is to remove the pet from the substance and reduce further exposure. Substances likely to be inhaled include gases, smoke,
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Some substances can cause pulmonary damage when ingested orally (eg, paraquat, minoxidil).1,11 Pulmonary injury depends on the mechanism of action of the substance.11 Substances may cause respiratory irritation (eg, ammonia, chloracne), asphyxiation (eg, carbon dioxide, carbon monoxide, methane, cyanide), increased bronchial secretions (eg, anticholinesterase insecticides), aspiration pneumonia (eg, hydrocarbons, activated charcoal), pulmonary edema (eg, sulfuryl fluoride, pine oil), or pulmonary fibrosis (eg, paraquat).2,11

Removing the pet from the source of exposure and providing adequate ventilation are generally sufficient methods of inhalation decontamination.2,3,6,11 Pets should be evaluated for respiratory changes, audible sounds, hypoxia, damage to the lining of the respiratory tract, and physical pulmonary injury.2,3,6 Oxygen support should be provided for pets in respiratory distress.2,3,6

Cautions and Contraindications. Certain agents, such as pepper spray or zinc/aluminum phosphine gas (ie, toxic gas produced in a pet's stomach after eating mole/gopher bait), can pose a hazard for veterinary staff if inhaled.2,3,6 In these cases, decontamination should take place in a well-ventilated area or outside.6

DECONTAMINATING SYMPTOMATIC OR DIFFICULT PETS

Decontaminating symptomatic or difficult pets can be challenging and must not cause additional stress or worsen the pet’s clinical signs (BOX 2). Some owners are unable to restrain animals for adequate bathing and ocular flushing, so veterinary attention is often required.6,8 In some cases, dermal and ocular decontamination may be less stressful for the pet and safer for the handler if the pet is sedated.1 Sedatives should be used only if the pet’s health allows.1,5 If sedatives are not used, the animal should be allowed to rest at regular intervals to minimize stress.1,5 Severely depressed or otherwise compromised pets should be monitored closely to avoid hypothermia, extreme stress, or aspiration.5

References

BOX 2 Case Example: Decontaminating a Symptomatic Pet

Sarge, a 4-year-old, 75-pound rottweiler mix, was sprayed directly in the face by a skunk. He presented to the clinic with difficulty breathing, blinking, drooling, and reeking of skunk spray. As a veterinary technician, what decontamination steps should you consider and in what order?

Stabilization and inhalation decontamination are the first steps that should be implemented. Sarge has been removed from the source of the toxin but needs oxygen support and respiratory evaluation. Once Sarge has been stabilized and examined, the second step is ocular decontamination with flushing, followed by a fluorescein eye test. The third step is dermal decontamination with the skunk-off mixture. Oral rinsing and dilution can also be considered in this case.

Although Sarge’s case is uncommon, veterinary technicians should be prepared and always consider the guidelines before proceeding with decontamination.

Toxicology Talk is written and reviewed by members of the American Society for the Prevention of Cruelty to Animals (ASPCA) Animal Poison Control Center (APCC). The mission of the APCC is to help animals exposed to potentially hazardous substances, which it does by providing 24-hour veterinary and diagnostic treatment recommendations from specially trained veterinary toxicologists. It also protects and improves animal lives by providing clinical toxicology training to veterinary toxicology residents, consulting services, and case data review.

The ASPCA APCC includes a full staff of veterinarians, including board-certified toxicologists, certified veterinary technicians, and veterinary assistants, and its state-of-the-art emergency call center routinely fields requests for help from all over the world, including South America, Europe, Asia, and the Pacific Islands.