Decontamination Essentials Including Emetics and Activated Charcoal
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All patients should be stabilized prior to attempts at decontamination. Once stabilization has been accomplished, decontamination should be considered to prevent systemic absorption of the toxicant. The specific method of decontamination chosen in each case must be guided by the species exposed and the exposure circumstances. When a patient has ingested a potentially toxic dose of a substance, the clinician has many options for decontamination including dilution, induction of emesis, gastric lavage, the use of adsorbents, cathartics, and administration of emenins. In many cases, the best treatment plan will include more than one of these methods.

Dilution using a small amount of milk or water is recommended in cases where irritant or corrosive materials have been ingested. A dose of 2-6 ml/kg is suggested, which for an average-sized cat, would be approximately only 1 – 2 teaspoons. Using only a small amount is important since using excessive amounts could lead to vomiting and re-exposure of the esophagus to the damaging material. Juicy fruits and vegetables can be fed to accomplish dilution in some patients, especially birds and reptiles. Dilution is not appropriate in patients who are at an increased risk for aspiration, including those who are actively seizing or obtunded. Dilution with milk, yogurt and cottage cheese has been useful in cases of oral irritation following ingestion of plants containing insoluble calcium oxalate crystals (Philodendron species, for example).

Emetics are usually most effective if used within 2-3 hours after the ingestion but in some cases, emesis may be effective even after that time frame. If the substance ingested could coalesce to form a bezoar in the stomach or a timed-release medication was ingested, emesis may be effective later than 3 hours after the ingestion. Chocolate and chewable medications are examples of products which may form bezoars. Emetics generally empty 40-60% of the stomach contents. Feeding a small moist meal before inducing vomiting can increase the chances of an adequate emesis.

Animals which are able to vomit safely include dogs, cats, ferrets, and potbelly pigs. Emetics should not be used in birds, rodents, rabbits, horses or ruminants. Rodents are unable to vomit. Rabbits have a thin-walled stomach putting them at risk for gastric rupture if they vomit.

Induction of emesis is contraindicated with ingestion of corrosive agents including alkalis and acids. The protective epithelial lining of the esophagus may be damaged initially when one of these products is swallowed. The muscular layer of the esophagus may be exposed and at risk for ulceration, perforation and scarring if vomiting does occur. Emesis is also not recommended after petroleum distillate ingestion due to the risk of aspiration. The clinician must also take into account when deciding whether to induce emesis, any pre-existing conditions of the patient that can cause vomiting to be hazardous including severe cardiac disease or seizure disorder. In all instances the attending veterinarian must carefully weigh the benefits of emesis against the risks. Emesis may not be needed if the animal has already vomited and is not appropriate if the animal is already exhibiting clinical signs such as coma, seizures or recumbency, which make emesis hazardous. Additionally, if the patient has ingested a CNS stimulant and is already agitated, the additional stimulation of vomiting could lead to seizures.

Hydrogen peroxide, apomorphine hydrochloride and xylazine hydrochloride are commonly used emetics in the veterinary clinical setting. Preliminary data obtained from the ASPCA Animal Poison Control’s toxicology database indicate that hydrogen peroxide and apomorphine are effective emetics in dogs. Emesis was successful in ninety-two percent of dogs when administered either 3% hydrogen peroxide or apomorphine. No significant adverse effects were reported in dogs after emetic use. Apomorphine was poorly effective as an emetic in cats and using it in cats is controversial. Xylazine was an effective emetic in only fifty-seven percent of cats. When emesis was successfully induced, sixty-eight percent of patients vomited some portion of the ingested toxicant.

Adsorbents may be utilized instead of or in addition to using an emetic or performing gastric lavage to prevent further systemic absorption of a toxicant. These agents act by adsorbing to a chemical or toxicant in the gastrointestinal tract and facilitating its excretion in the feces. Activated charcoal is the most commonly used adsorbent.

Activated charcoal is composed of large porous particles that adsorb to and therefore trap a wide range of organic compounds within the gastrointestinal tract. It is created from materials such as coal, wood, rye starch and coconut shells through a process using acid and steam treatments. Charcoal tablets and capsules available over the counter which are used to control flatulence and bloating are not likely to be as effective adsorbents as the commercially prepared products since the concentration of charcoal in the capsules is often low and the binding area much smaller.

Repeated doses of activated charcoal should be considered in some instances where toxicants are known to undergo enterohepatic recirculation. In enterohepatic recirculation, the toxicant is first carried to the liver by either the portal vein after absorption from the gastrointestinal tract or via the systemic circulation. Once in the liver the toxicant then enters the bile and is excreted into the gastrointestinal tract where it is again available for absorption. Examples of toxicants known to undergo this type of recycling include...
most NSAIDs, marijuana and digoxin. When repeated doses are indicated, half the original dose should be given at 4 to 8 hour intervals.

Administration of activated charcoal does carry some risks and it does not bind all compounds equally. Some chemicals that are not bound effectively include: ethanol, methanol, fertilizer, fluoride, petroleum distillates, most heavy metals, iodides, nitrates, nitrites, sodium chloride, and chlorate. Activated charcoal should not be given to animals that have ingested caustic materials. It is unlikely to bind them and it can be additionally irritating to the mucosal surfaces and make visualization of oral and esophageal burns difficult. Activated charcoal can cause a false positive on an ethylene glycol test since propylene glycol is found in many formulations. Additionally, the timing of the activated charcoal administration should be taken into account when deciding on dosing of other oral medications since the charcoal can also bind them.

Activated charcoal administration carries a significant risk of aspiration. If a patient does aspirate the charcoal, the prognosis is poor hence proper placement of the stomach tube and a protected airway is a must in symptomatic patients. Constipation and black bowel movements are possible making it difficult to determine if melena is present. If the activated charcoal sits within the gastrointestinal tract for a significant period of time, it may release the compound it has adsorbed. It is for this reason that activated charcoal is frequently administered with a cathartic. Many commercially available preparations do contain a cathartic such as sorbitol.

Hypernatremia is another possible adverse effect of activated charcoal administration. In humans, hypernatremia has been reported primarily in children when multiple doses of a charcoal-sorbitol mixture were administered. The mechanism of hypernatremia is attributed to a water shift from the intracellular and extracellular spaces into the gastrointestinal tract as a result of the osmotic pull of the sorbitol cathartic. The ASPCA Animal Poison Control Center (APCC) has also received reports of elevated serum sodium following activated charcoal administration in dogs. Hypernatremia appears to be reported more often in small dogs receiving multiple doses of activated charcoal, but it has also been reported in large dogs and in cases receiving only a single dose. Furthermore, unlike the human reports, elevated serum sodium has also been noted in cases where no cathartic was present in the charcoal. In hypernatremia cases, the APCC has found that administration of a warm water enema is effective at lowering the serum sodium and controlling the resultant central nervous system effects.

Cathartics enhance elimination of substances, including administered activated charcoal, by promoting their movement through the gastrointestinal tract. Activated charcoal only binds to toxicants by weak chemical forces, so without cathartics the bound toxicant can eventually be released and reabsorbed. When used with activated charcoal, the cathartic is given immediately following or mixed with the charcoal. Cathartics are contraindicated if the animal is dehydrated, has diarrhea, if ileus is present, or if intestinal obstruction or perforation are possible. Sorbitol is the most commonly used cathartic; it is the cathartic of choice and is frequently combined with activated charcoal in commercially prepared charcoal products.

Enemas may be indicated when elimination of toxicants from the lower gastrointestinal tract is desired. Medications formulated as extended-release or controlled-release are absorbed from the entire gastrointestinal tract, including the colon. An enema can be used to move those medications through the colon quickly and lessen additional systemic effects. The general technique is to use plain warm water or warm soapy water.