Emesis & Activated Charcoal

Valentina Merola, MS, DVM, DABVT, DABT
ASPCA Animal Poison Control Center

Decontamination is frequently a first consideration in toxicosis cases, but induction of emesis or administration of activated charcoal may not always be indicated—in some cases, it can be harmful.

P Profile

- Major human clinical toxicology associations have noted that neither the use of ipecac to induce emesis nor administration of a single dose of activated charcoal is routinely recommended.[1,2]
  - No evidence that emesis or activated charcoal improves clinical outcomes was found.
- In veterinary medicine, however, emesis and activated charcoal are still viable options for decontamination.
  - Dogs commonly consume large enough amounts of toxicants to make gastric decontamination a valuable option.
  - In dogs and cats with successful emesis induction, at least some of the ingested toxicant was recovered in 68% of cases.[3]
  - Induction of emesis or administration of activated charcoal should be evaluated on a case-by-case basis.

Tx Treatment

Considerations

- Stabilization is the first priority.
  - If the patient is dehydrated, activated charcoal administration can increase risk for electrolyte disturbances and emesis can worsen dehydration.
- If the animal has already vomited multiple times, encouraging additional emesis may not be beneficial.
  - Administration of activated charcoal should be postponed until vomiting has been controlled.

If the patient is dehydrated, activated charcoal administration can increase risk for electrolyte disturbances, and emesis can worsen dehydration.

MORE ▶

- GI ulceration or perforation should be ruled out before administration of activated charcoal, as the charcoal could impair healing of ulcers or, in cases of perforation, contaminate the abdominal cavity.
- If the patient is at risk for developing or suspected to have ileus or GI obstruction, activated charcoal should be avoided until these conditions are ruled out.
- Activated charcoal is of limited benefit in cases of poisoning with xylitol, alcohols, heavy metals, strong acids/bases, and many other small molecules because of poor binding ability.
- Some toxicants (eg, marijuana, antihistamines) have antiemetic properties; immediate administration of activated charcoal may be more beneficial.[5]
- Because some toxicants (eg, grapes, chocolate) remain in the stomach for long periods, emesis may still be beneficial several hours after exposure.
- Some medications come in extended-release formulations for longer or slower absorption times.
  - Decontamination may be effective later than typically expected.
- If the toxicant undergoes enterohepatic recirculation (eg, bromethalin, naproxen), activated charcoal may be beneficial for up to 72 hours following exposure.

Outpatients

- At-home emesis is only indicated if the patient is stable.

Dogs

- Owners should offer dogs bread first; emesis may be more productive with a full stomach.[5]
  - In toxicity cases involving zinc phosphide or aluminum phosphide, no food should be given.
    - Food stimulates production of stomach acid, which causes release of toxic phosphine gas.[5]
- Walking the pet or allowing it to move around may help stimulate vomiting.[4]
- Hydrogen peroxide 3% at 1 mL/lb PO should be administered up to 45 mL.
  - Further administration is likely of little benefit and can cause injury to the esophageal and gastric mucosa.

Cats

- Emesis is only recommended at home in extenuating circumstances.
- Hydrogen peroxide is effective in 30% of cases,[3] and adverse effects (eg, severe, bloody vomiting) can occur.

Inpatients

Dogs

- Apomorphine at 0.03 mg/kg IV or 0.04 mg/kg IM or a portion of a tablet crushed and dissolved in water for administration into the conjunctival sac
  - This acts by stimulating dopaminergic receptors in the chemoreceptor trigger zone (CTZ).[5]
  - Sedation can be reversed with administration of naloxone, but it will not stop the vomiting.[4]
  - The conjunctival sac needs to be rinsed after emesis.
- Hydrogen peroxide may be considered if toxicant has antiemetic effects at the CTZ (eg, phenothiazines).
- Both hydrogen peroxide and apomorphine are >90% effective in dogs.[3]

Cats

- Xylazine (0.44 mg/kg IM) is effective in ~57% of cases.[3]
  - Sedation can be reversed with yohimbine.
- Apomorphine is rarely effective in cats.[3]

Contraindications for GI Decontamination

In some situations, emesis should not be induced and activated charcoal should not be given, including:

1. Patient has moderate to severe CNS depression or stimulation or is having seizures (because of risk for aspiration); unless the CNS signs are readily reversible (eg, with administration of atipamezole for amitraz toxicosis), emesis should not be induced and activated charcoal should only be given with a cuffed endotracheal tube in place.
2. Patient has underlying health problems that may compromise ability to protect the airway.[4]
3. The toxicant is caustic or corrosive. Reexposing the esophagus by inducing emesis can cause further damage.[5] Activated charcoal may not bind well to caustics or corrosives and can impair healing.
4. The agent is a volatile hydrocarbon or petroleum distillate (causing risk for aspiration).
5. The agent is likely to cause rapid onset of serious signs (eg, seizures, coma) before vomiting occurs.
6. If it is suspected that the patient may require enterotomy or gastrotomy, activated charcoal should not be given.

CTZ = chemoreceptor trigger zone

Contraindicated Emetics

- **Table salt**: Not a reliable emetic and can result in life-threatening hypernatremia[5]
- **Syrup of ipecac**: Less readily available and less effective than hydrogen peroxide; can be cardiotoxic with high dose[5]
- **Mechanical methods** (eg, fingers down the throat): Considered to be generally ineffective[4]

Administering Activated Charcoal

- Only medicinal-grade activated charcoal (1–2 g/kg PO) should be used.
- Medicinal-grade charcoal has a large surface area for binding to toxicants.[5]
- Multiple-dose activated charcoal can be beneficial in some circumstances (ie, if it undergoes enterohepatic recirculation).

Follow-up

Complications

- Marked or bloody vomiting can result from administration of hydrogen peroxide.
- CNS depression is possible with administration of apomorphine or xylazine.
  - ❑ Depression may be reversed with naloxone (with apomorphine) and atipamezole or yohimbine (with xylazine).
- Electrolyte disturbances (ie, hypernatremia, hypermagnesemia, hypokalemia) can occur following administration of activated charcoal.
  - ❑ Monitoring electrolytes is always recommended with multiple-dose activated charcoal and suggested with a single dose.
- Activated charcoal can increase serum osmolality, osmolal gap, and serum lactate concentration.[6]
- Aspiration of charcoal or stomach contents can occur.
- Vagal events or bradycardia may occur.

In General

Relative Cost

- General costs: $–$$ ■ cb

Cost Key

$ = up to $100
$$ = $101–$250
$$$ = $251–$500
$$$$ = $501–$1000
$$$$$ = more than $1000

See **Aids & Resources**, back page, for references & suggested reading.