



Chocolate Toxicosis in a Border Terrier

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A 2-year-old, 15-pound, neutered male border terrier presented after eating a large amount of Halloween candy.

History. The owner found a large number of candy wrappers, along with a dumped-over pumpkin used for trick-or-treating. The owner estimates the dog ate about 8 oz of fun-sized candy bars, and almost all of the candy ingested contained milk chocolate, judging from the wrappers found on the floor. Ingestion occurred about 1.5 hours previously.

Examination. The dog is bright, alert, and responsive. All vital signs are normal, and no significant abnormalities are found on the physical examination.

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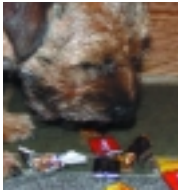
ASK YOURSELF...

Based on the information provided by the owner, which of the following clinical signs might be expected from this chocolate ingestion?

- A. pancreatitis
- B. mild vomiting, diarrhea, hyperactivity
- C. vomiting, diarrhea, hyperactivity, tremors
- D. vomiting, diarrhea, hyperactivity, seizures, cardiac arrhythmias
- E. none—amount of chocolate ingested is below toxic levels

INSIGHTS FROM CLINICAL CASES . DISCUSSION

Correct Answer: D Vomiting, diarrhea, hyperactivity, seizures, cardiac arrhythmias



Although milk chocolate is not as toxic as dark, semi-sweet, or baking chocolate, it averages 60 to 66 mg of methylxanthines per ounce of chocolate.

Therefore, this dog ingested approximately 76.25 mg/kg of methylxanthines. Dark or semi-sweet chocolate averages 150 mg/ounce, and baking chocolate averages 450 mg per ounce.

Mild reactions may be seen at 20 mg/kg. Moderate to severe reactions occur at doses exceeding 40 mg/kg. Cardiotoxicity begins at 50 mg/kg, and seizures are possible at doses greater than 60 mg/kg. Any dose that exceeds 40 to 45 mg/kg should be considered potentially life-threatening. The published LD₅₀ for caffeine, a methylxanthine, is 140 mg/kg, meaning that half of the animals will die at this dose. However, without decontamination or treatment, some would die or develop significant clinical signs at exposures well below the LD₅₀.

Mechanism of Action. Chocolate contains the methylxanthines caffeine and theobromine. These agents cause a variety of actions in the body. The most clinically relevant mechanism involves competitive antagonism of cellular adenosine receptors. Inhibition of adenosine receptors accounts for bronchodilation and hyperactivity as well as other behavioral effects. Methylxanthines increase the amount of calcium entering cells, which can lead to muscle tremors and seizures. Cardiac arrhythmias are most likely caused by increased levels of circulating catecholamines. Methylxanthines are eliminated in the bile and through urine.

Clinical Signs. The most common signs of chocolate overdose include vomiting, restlessness, hyperactivity, tachycardia, and tachypnea. These initial signs can lead to muscle tremors, seizures, and other cardiac arrhythmias. Some

dogs develop pancreatitis after chocolate ingestion, regardless of the dose.

Treatment. Decontamination (by emesis and/or administration of activated charcoal) is recommended in asymptomatic animals. Because chocolate is digested rather slowly or may form a lump in the stomach, emesis may be successful several hours after ingestion. Several doses of activated charcoal are indicated.

Heart rate and rhythm should be monitored. Diuresis is recommended to increase excretion of methylxanthines through the urine. Because methylxanthines can be resorbed from the urinary bladder, catheterization can be advantageous, or the animal can be walked frequently to encourage urination. Symptomatic and supportive care includes controlling tremors and seizures and managing arrhythmia as needed.

No specific clinicopathologic abnormalities are reported for methylxanthine ingestion. Blood work may show increased pancreatic enzymes.

Differential Diagnosis. Agents with similar actions include pseudoephedrine, amphetamines, antihistamines, cocaine, and other substances that can cause seizures.

Treatment Endpoint and Prognosis. Signs generally resolve within 48 hours. While doses greater than 45 mg/kg may be life-threatening, animals that receive veterinary care generally have a good prognosis.

Case Presentation Follow-up. In this case, emesis was induced, and the dog vomited a large amount of chocolate-colored fluid as well as an undetermined amount of chocolate bits. The amount of chocolate remaining in the stomach could not be estimated. Activated charcoal was administered, and repeated 6 hours later. The dog was hospitalized for 12 hours for monitoring, after which it was discharged, asymptomatic. ■

See Aids & Resources, back page, for references, contacts, and appendices.

Tx ...at a Glance

DECONTAMINATION

- Recent ingestion (within 6 hours): Induce emesis; administer activated charcoal. Activated charcoal can be repeated every 3 to 6 hours up to 72 hours after ingestion.
- If amount of chocolate remaining in patient's system is estimated < 20 mg/kg, no additional treatment is required.
- Ingestion ≥ 6 hours before presentation: Administer activated charcoal. Repeat as necessary.
- Observe asymptomatic animals for 12 hours.

LABORATORY

- Baseline chemistry and electrolyte values. Monitor acid-base status in symptomatic animals.

SYMPTOMATIC CARE

- Monitor heart rate/rhythm. Treat bradycardia with atropine (0.01–0.02 mg/kg IV) and tachycardia with β-blockers (propranolol or metoprolol 0.04–0.06 mg/kg slow IV). Ventricular tachyarrhythmias in dogs not responding to β-blockers can be treated with lidocaine (1–2 mg/kg IV, followed by 0.1% solution administered at 30–50 µg/min).
- Tremors can be controlled with diazepam (0.5–2.0 mg/kg IV) or methocarbamol (50–220 mg/kg slow IV, up to 330 mg/kg/day).
- Treat seizures with diazepam (0.5–2.0 mg/kg IV). If patient does not respond, try barbiturates or gas anesthesia as needed.
- Monitor respiration.
- Perform fluid diuresis. Catheterize the urinary bladder or walk frequently.