Marijuana Intoxication in a Pit Bull

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Stevie, a 3-year-old, 50.8-lb (23.1-kg), neutered male pit bull, was presented for an emergency examination approximately 3 hours after the owner noticed an acute onset of lethargic behavior.

The owner reported that Stevie had behaved normally the previous night. He was the only dog in the household and had access to a garage and fenced yard. There was no history of tick bites or travel. Stevie had been neutered at 8 months of age with no complications and had no major medical or surgical history. He was up-to-date on flea, tick, and heartworm preventives and received no other medications.

Physical Examination

Physical examination revealed a rectal temperature of 98°F (36.7°C), heart rate of 60 bpm, and respiratory rate of 24 breaths per minute. Stevie was mildly

(ie, 6%) dehydrated and dribbled urine while walking. During the neurologic examination, Stevie fell asleep during periods of inactivity but had times of hyperresponsiveness to mild-to-moderate stimulation. Marked proprioceptive ataxia with bilateral mydriasis and sluggish pupillary light reflexes were noted. The rest of the physical examination was unremarkable.

Diagnosis

CBC and serum chemistry profile were normal. Blood pressure measured by Doppler method was 118 mm Hg. An over-the-counter (OTC) urine drug screen test was performed and was positive for tetrahydrocannabinol (THC; see *Urine Drug Screen Tests*). The owner affirmed that Stevie had the potential for recent (ie, <4 hours) marijuana exposure.

Dogs that have ingested or inhaled THC can exhibit neurologic and GI signs, seizures, recumbency, and stupor that should correlate to the estimated dose ingested (see *Take-Home Messages*, page 36). The pharmacokinetics of marijuana in dogs is similar to that in humans (ie, rapid oral absorption and slow metabolization). Clinical signs in dogs typically appear within 1 to 3 hours and can last up to 36 to 48 hours after exposure.¹

DIAGNOSIS: TETRAHYDROCANNABINOL INTOXICATION

Treatment & Long-Term Management

Because of the possible recent exposure to THC, emesis was induced (see *Treatment at a Glance*) with apomorphine (0.03 mg/kg IM). Inducing emesis can remove toxins, but there are risks for aspiration pneumonia due to decreased mentation, and emesis is not indicated in every case of THC intoxication. Stevie was determined by the clinician to be sufficiently alert with an intact gag reflex to allow induction of emesis. He produced 2 bouts of vomitus that contained what appeared to be plantlike material (species was not identified). Following emesis, an antiemetic (ie, maropitant [1 mg/kg SC]) was administered, and Stevie was started on the following supportive care treatments:

- ► Activated charcoal with sorbitol (1-2 g/kg PO); repeat doses were not given.
- ▶ Balanced electrolyte solution at a maintenance rate (58 mL/hr IV), plus correction of 6% dehydration over 24 hours (58 mL/hr IV) for a total of 116 mL/hr over 24 hours
- Maintenance rate (mL/day) = $132 \times (body weight_{kg}^{0.75})$
- Dehydration² = body weight_{kg} × % dehydration (as a decimal) = fluid deficit in liters
- Orders were given for diazepam (0.5 mg/kg IV) to be administered as needed to control agitation, tremors, and/or seizures; however, this medication was not administered, as it was not needed.

Intralipid emulsion (ILE) therapy was considered but deemed unnecessary. Anecdotal evidence and experimental studies using intravenous lipid emulsion to treat highly lipid-soluble toxicities have been reported in human and veterinary medicine.³ The mechanism of action of ILE therapy remains largely theorized and unknown. Dosing recommendations include an initial bolus of 20% lipid emulsion (1.5 mL/kg), followed by a constant-rate infusion (0.05-0.25 mL/kg/min; not to exceed 10 mL/kg) over 30 minutes.³

Stevie's vitals returned to normal after several hours of supportive care and monitoring, during which time mentation slowly improved. He was discharged 24 hours after admission with no further medication.

URINE DRUG SCREEN TESTS

The accuracy of OTC urine drug screen tests has not been validated in dogs. The main psychoactive substance in marijuana, Δ -9-THC, is metabolized in the liver and excreted primarily through feces, with approximately 20% excreted through urine.⁶ Urine metabolites excreted by dogs appear larger and more fragile than those excreted by humans, which may be a variable as to why OTC drug screen tests fail to detect the metabolites. In humans, the approximate time for detection of THC in OTC urine drug screen tests ranges from 4 hours to 3 days, with a minimum detection limit of 50 ng/mL.⁷ The THC detection window remains controversial in humans due to a variety of factors (eg, acute vs chronic use) and has not been determined in dogs.⁸

TREATMENT AT A GLANCE

- If recent ingestion is known, early decontamination (eg, induction of emesis, administration of activated charcoal) should be performed if the patient is stable.^{1,5,6}
- Treatment is mostly based on supportive care for clinical signs (eg, intravenous fluid support, thermoregulation).^{1,5,6,9}
- Intravenous lipid emulsion therapy has been reported in severe cases, as THC is a highly lipid-soluble compound.³

ILE = intralipid emulsion OTC = over-the-counter THC = tetrahydrocannabinol Patients with nonsevere marijuana intoxication may improve slowly over the course of a few hours, in which case some owners may elect to take their pet home. Recommendations for hospitalization can be made for patients that are severely affected or dehydrated or if owners prefer that their pet recover while under professional medical supervision.

Prognosis & Outcome

The prognosis for marijuana intoxication is generally good with treatment. Fatalities are rare but have been documented.^{4,5} ILE therapy has been successfully described in patients that have ingested high concentrations of THC and in patients presented with severe clinical signs.³

TAKE-HOME MESSAGES

- ► THC intoxication is caused by inhalation of the smoke or ingestion of any portion of the plant, products laced with marijuana, or products made with concentrated THC oil.
- ▶ Neurologic and GI signs (eg, CNS depression, ataxia, vomiting, tremors, acute onset of urinary incontinence) are the most commonly reported clinical signs of marijuana intoxication in dogs.^{1,4,5,9}
- ▶ THC is lipid-soluble and undergoes enterohepatic recirculation.
- ▶ The minimum lethal THC dose in dogs is >3 g/kg; however, the ingestion dose is rarely known.⁵
- ▶ Recovery is dose-dependent and may take 24 to 72 hours.
- OTC urine drug screen tests have not been validated in dogs, and false-negative results are common.

POLL

For those located in states where recreational marijuana use has been legalized, have you seen an increase in marijuana intoxication cases since legalization?

- A. Yes
- B. No
- C. I have suspected cases of marijuana intoxication but have not confirmed them.
- D. I have never seen a case of marijuana intoxication.
- E. I am not located in a state where recreational marijuana use has been legalized.

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