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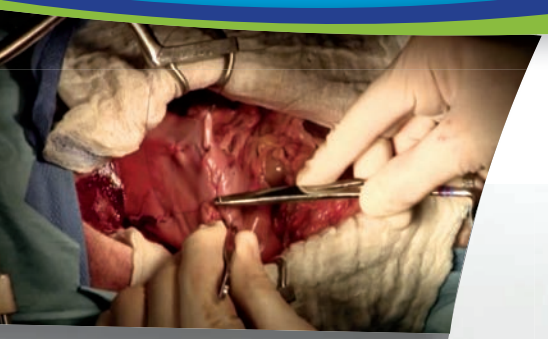

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Mission

Veterinary Medicine is a peer-reviewed journal dedicated to providing concise, credible, and essential information on the most common and crucial clinical problems seen in companion-animal practice.

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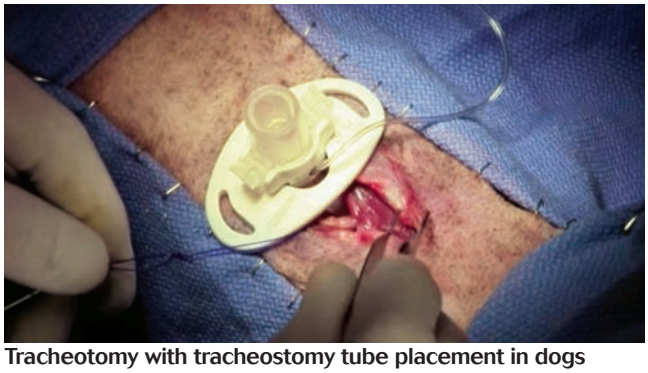
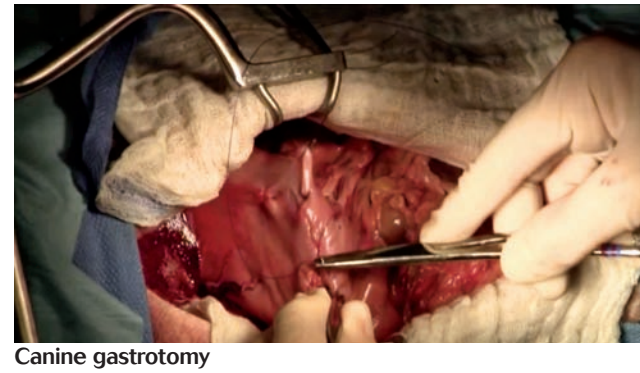
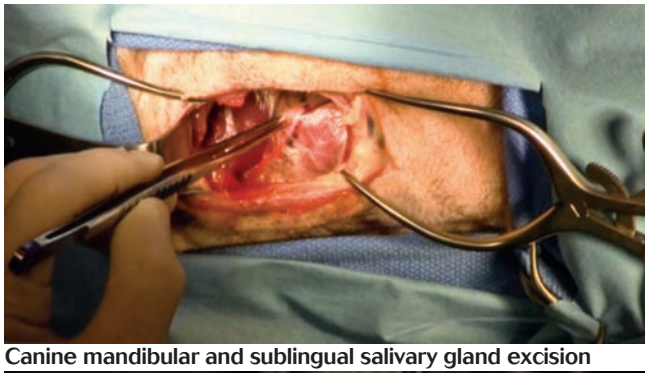
In a partnership with the Oquendo Center in Las Vegas, Nevada, *Veterinary Medicine* worked with Don Waldron, DVM, DACVS, chief medical officer of the Western Veterinary Conference, to capture six step-by-step videos on common surgeries. Find them all at **dvm360.com/waldron-video**.



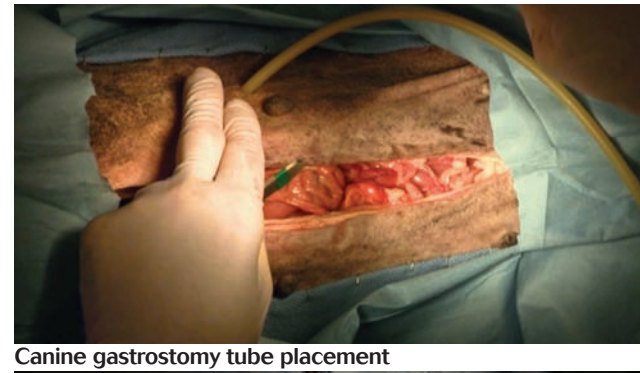
Tracheotomy with tracheostomy tube placement in dogs



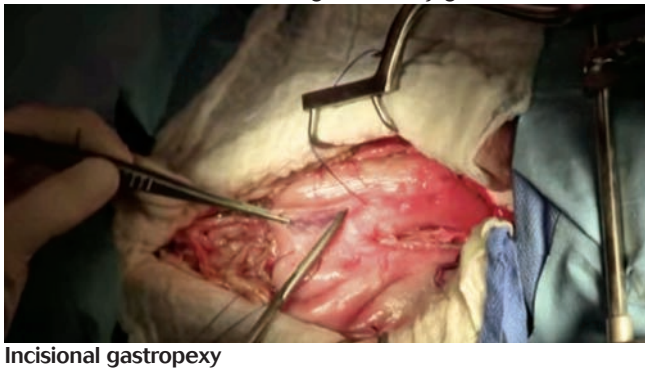
Canine gastrotomy



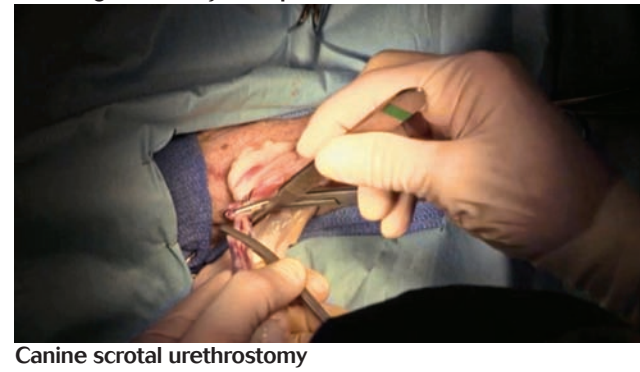
Canine mandibular and sublingual salivary gland excision



Canine gastrostomy tube placement



Incisional gastropexy



Canine scrotal urethrostomy

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The **importance** of taking a complete **dermatologic history**

And how to do it right—including a comprehensive downloadable client history form.

By Douglas J. DeBoer, DVM, DACVD

Hear all about it!

Listen to Dr. DeBoer discuss what cues in the patient history should make you suspect atopic dermatitis by scanning the QR code below or by visiting **dvm360.com/CVCADHistory**.

Taking a thorough patient history is fundamental in assessing patients with skin disease. The clinical signs, age of onset, duration, location and extent of pruritus, treatments already used, and many more factors are often valuable clues for diagnosis. Obtaining all of the necessary information is a time-consuming task that may seem impossible to accomplish in a brief office visit.

Using a dermatology history form is greatly helpful in this regard (visit **dvm360.com/DermHistoryForm** to download a form you can use in your clinic). The form is intended to be filled out in advance by the client—in the waiting room or perhaps even at home if it is available as a download from the clinic website. It's easy and quick to review the form before entering the examination room. Then, taking the history is a matter of clarifying points of uncertainty, expanding on others, and summarizing your understanding to the owner. The following are some major points to consider.

DERMATOLOGY HISTORY FORM

[Patient label information here]

Date _____

Your name _____

1. What skin or ear problem are you bringing your pet in for? _____
2. How long has the problem been present? _____ How old was your pet when the problem first started? _____
3. When the problem started, did it come on suddenly or gradually over a period of time? _____
4. What did the skin or ear problem look like initially? _____
5. How has it changed or spread? _____
6. The problem has been (check one):
   ☐ Continual, even with medication ☐ Continual but better with medication ☐ Intermittent or sporadic
7. Is the problem worse during certain times of the year? If so, when? _____
8. Over the past year, how itchy has your pet been during a typical outbreak of skin or ear disease? Use a scale of 1 to 10 with 1 meaning an occasional scratch, like a normal person or animal might do, and 10 meaning constant, severe scratching. _____
9. Using the same 1 to 10 scale, how itchy has your pet been over the past month? _____
10. Is your pet receiving any treatment now? If yes, what kind? _____
11. When did your pet last receive any medication, and what medication was it? _____
12. What do you feed your pet now? _____
13. Have any different diets been tried as treatment? If so, list the brand name and for how long you fed it: _____
14. How often do you usually bathe your pet? With what? _____
15. When was the last time you saw a flea on your pet or another pet in the household? _____
16. Do you routinely use flea or tick preventive products on your pet (list type)? _____
17. How old was your pet when you obtained him/her? Where did you get your pet? _____
18. What other pets are in the household? _____
19. Do any of the other pets have skin problems? Do any people in the household have skin problems? _____
20. What percentage of the day and night does your pet spend indoors vs. outdoors? Indoors ___% Outdoors ___%
21. Other than skin disease, does you pet have any diagnosed medical problems? _____
22. Please list any other clinical signs your pet has that have not been described above or anything else you suspect might be contributing to your pet's skin or ear disease? _____

PLEASE TURN OVER AND CONTINUE ON REVERSE SIDE.

Go to dvm360.com/DermHistoryForm to download and use this dermatology history form to make sure you're capturing all the information you need at each itchy pet visit.

Major client complaint

Is it itching? Hair loss? Lesions? All of the above? Regardless of your overall findings, make sure to address the client's major concern.

Description of disease onset

When, where, and how did it start? Did the itch come first and then the lesions? Or was it the reverse? Or both at the same time?

- Parasites or infections can occur at any age. A young onset may favor allergy. An older onset may signify underlying systemic, metabolic, or autoimmune disease. Geriatric patients may lead you to consider skin neoplasia or a paraneoplastic syndrome.
- Itch first without lesions tends to favor allergic causes. Lesion appearance first or at the same time as itch tends to favor parasitic or infectious causes.

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[1]Data on file. Hill's Pet Nutrition, Inc.
[2]Kruger JM, Lulich JP, Merrils J, et al. *Proceedings.* American College of Veterinary Internal Medicine Forum 2013.

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- Parasites or infections are typically a sudden onset, while allergic causes are usually gradual onset.

Description of skin disease progression

Be sure to note any changes with season or with medication. Seasonality may suggest environmental allergy, and a response (or lack of response) to prior treatments may provide clues.

Degree and location of pruritus

The distribution may be highly suggestive. For example, a dorsal lumbosacral focus can often be assumed to be flea allergy until proven otherwise, while pedal or pinnal pruritus is suggestive of environmental or food allergy. For dogs, some history forms may incorporate the Favrot criteria for clinical evidence of atopic dermatitis.[1]

Current and prior treatments and response

Be sure to ask about different diets that have been tried. Was a complete and proper hypoallergenic diet trial performed (*i.e.* with strict compliance and a veterinary therapeutic diet)?

Parasite history and current parasite control—or lack thereof

For pruritic skin disease in dogs and cats, instituting regular parasite control is a standard recommendation.

Evidence of contagion to other animals or people

Any evidence of contagion signals a parasite or dermatophyte infection.

Clinical signs the owner has observed

Be sure to assess the severity of the signs as well. Using a grid- or table-like form enables you to quickly scan down to see the signs that are "moderate" or "severe."

Evidence of concurrent disease

Is there any suggestion of underlying disease? Gastrointestinal signs that may encourage consideration of food allergy as a cause?

Owner's thoughts on the cause of the disease

At the very least, you may be able to assure the owner of what is not causing the pet's illness, such as allergy to carpet fibers, perfumed laundry detergent, fabric softener sheets, or other urban myths.

Closing thoughts

The other big advantage of a history form is that you now have all the information for every patient all in the same location in the record. Months later, if you need to look back to see how the client rated the dog's pruritus or whether other diets were tried, you'll know exactly where to find the information. VM

Reference

1. Favrot C, Steffan J, Seewald W, et al. A prospective study on the clinical features of chronic canine atopic dermatitis and its diagnosis. *Vet Dermatol* 2010;21(1):23-31.

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Albuterol toxicosis in a pit bull terrier

By Brandy R. Sobczak, DVM

A 2-year-old 58.7-lb (26.5-kg) spayed female pit bull terrier was presented to an emergency clinic for evaluation of panting and what the owner suspected to be tachycardia, since the owner felt like the dog's heart was racing.

HISTORY

About five hours earlier, the owner had discovered an aerosol albuterol inhaler (90 µg/actuation) in the dog's crate with two punctures in it. The owner had used this inhaler only a couple of times. The dose of albuterol the dog was exposed to could not be determined.

The dog had a history of allergies and atopy. It was receiving prednisone every other day.

PHYSICAL EXAMINATION AND DIAGNOSTIC TESTS

At presentation, the dog was tachycardic with a heart rate of 220 bpm and was panting. Its body temperature was normal (100.4 F). The conjunctiva was hyperemic bilaterally, and its digits were erythematous. The patient had areas of multifocal alopecia (suspected to be secondary to allergies). Abnormal laboratory results included hypokalemia (serum potassium = 2.6 mmol/L; normal range = 3.4 to 4.9 mmol/L), hyperglycemia (serum glucose = 121 mg/dl; normal range = 60 to 115 mg/dl), metabolic acidosis (blood pH, venous = 7.304; normal range = 7.35 to 7.45), and base excess (-8; normal range = -5 to 0).

TREATMENT

The dog was admitted to the hospital for treatment of tachycardia, electrolyte concentration monitoring, and supportive care. Plasma-Lyte (Baxter) intravenous fluids, supplemented with 40 mEq/L of potassium chloride, were administered at 90 ml/hr, and 10 mg of propranolol (0.37 mg/kg) was given orally since the intravenous form was not available. The patient's heart rate, blood pressure, and electrolyte concentrations, including serum potassium and phosphorus, were monitored over the next 18 hours.

Within two hours of giving the propranolol, the dog's heart rate was approximately 160 bpm and then remained 150 bpm or less for the duration of hospitalization. The panting resolved within two hours of initiating treatment, and the conjunctival hyperemia resolved as well.

Within five hours of presentation, the acidosis had resolved, but the patient's potassium concentration was still slightly low (3.3 mmol/L). Within nine hours of presentation, the serum potassium concentration was normal (4.2 mmol/L). The potassium chloride supplementation within the Plasma-Lyte was then changed to 20 mEq/L. The dog's blood pressure and electrocardiogram (ECG) remained normal throughout hospitalization.

The patient was discharged 18 hours after being admitted to the hospital.

DISCUSSION

Albuterol toxicosis is common in dogs because dogs

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tend to chew on albuterol-containing inhalers and the liquid vials used in nebulizers. Since 2002, the ASPCA Animal Poison Control Center (APCC) has received more than 4,000 calls about albuterol exposures. More than 95% of these calls involved dogs (ASPCA APCC Database: Unpublished data, 2002-2013).

Pathophysiology

Albuterol is a beta-adrenergic agonist used primarily in veterinary medicine as a bronchodilator in dogs, cats, and horses.[1] Recommended doses in dogs range from 0.02 to 0.05 mg/kg orally every eight to 12 hours.

In overdose situations, the selectivity for beta-2 receptors is lost, and albuterol will stimulate both beta-1 and beta-2 receptors.

For inhalation in a 60-lb dog, 0.5 ml of a 0.5% solution for nebulization mixed in 4 ml of saline can be nebulized every six hours.[1]

Beta-adrenergic receptors are divided into mainly two types: beta-1 and beta-2. Beta-1 receptors are found within the myocardium and control the heart rate and contractility. Beta-2 receptors are located primarily within the smooth muscles of the blood vessels, airways, gastrointestinal tract, and genitourinary system. There are also beta-2 receptors within the heart, liver, and skeletal muscles.[2] These receptors are responsible for the relaxation of the uterine and bronchial smooth muscles and for vasodilation.[3]

Albuterol is a selective beta-2 receptor agonist. When used to treat bronchoconstriction, beta-adrenergic agonists bind to the beta-2 receptors located on the bronchial smooth muscle. This binding stimulates a conversion of adenosine triphosphate into cyclic adenosine monophosphate. Increased cyclic adenosine monophosphate causes bronchial muscle cells to relax, resulting in bronchodilation.[4,5]

Even with therapeutic doses, clinical effects may include transient hypotension, reflex tachycardia, and mild muscle tremors, in addition to the desired bronchodilation, because of multiple beta-2 receptor binding sites within the body.[5] In overdose situations, the selectivity for beta-2 receptors is lost, and albuterol will stimulate both beta-1 and beta-2 receptors.

Clinical signs

Clinical signs associated with overstimulation of both beta-1 and beta-2 receptors, as well as catecholamine release, can include tachycardia, hypotension, hypertension, muscle tremors, vomiting, tachypnea, agitation, hyperactivity, arrhythmias (most commonly supraventricular tachycardia), lethargy, and weakness. This muscle weakness and lethargy could be secondary to hypokalemia or discomfort from the tachycardia and a result of poor cardiac output secondary to significant tachycardia, myocardial fatigue, or myocardial ischemia. Patients that do not receive prompt treatment for supraventricular tachycardia may be more likely to develop ventricular arrhythmias.

Hypokalemia may develop secondary to an intracellular shift of potassium and could contribute to arrhythmias seen in some patients. Hypophosphatemia may also be seen, and it is also thought to be from intracellular movement.[2,5]

Treatment and monitoring

Since the ventricular tachycardia in albuterol toxicosis occurs from the overstimulation of beta receptors, both beta-1 and beta-2 receptors are involved.

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Propranolol works well to treat these signs. Propranolol is a nonspecific beta-blocking agent, which means it can block both beta-1 and beta-2 receptors. Therapeutic doses range from 0.02 mg/kg slowly intravenously up to a maximum of 0.1 mg/kg in dogs and cats, 0.1 to 0.2 mg/kg orally in dogs up to a maximum of 1.5 mg/kg every eight hours, and 2.5 to 10 mg total in cats every eight to 12 hours.[1]

An alternative medication used to treat the clinical signs of albuterol toxicosis is esmolol. Esmolol is a specific beta-1 adrenergic blocker that is used to control ventricular arrhythmias. It can be administered to dogs as an initial slow intravenous bolus of 0.25 to 0.5 mg/kg over one or two minutes, followed by a constant rate infusion of 0.01 to 0.2 mg/kg/min.[1]

Monitoring serum electrolyte concentrations, especially potassium and phosphorus, is important because many patients exposed to albuterol develop hypokalemia and hypophosphatemia. Hypokalemia and hypophosphatemia likely occur secondary to intracellular shifts, so use caution to not oversupplement intravenous fluids with potassium chloride or phosphorous. If the potassium concentration is < 2.5 mEq/L, then supplementation with potassium chloride is needed. The phosphorus concentration will often correct when the potassium concentration is corrected. Monitor electrolyte concentrations every four to six hours until they are normal.

Stimulatory signs such as tremors, hyperactivity, and agitation are often well-controlled with benzodiazepines such as diazepam (0.5 to 1 mg/kg intravenously) or midazolam (0.1 to 0.5 mg/kg intravenously).[1] Signs of muscle weakness and lethargy often resolve once the patient's electrolyte concentrations and heart rate are regulated.

Administering activated charcoal is usually not practical after exposure to an albuterol inhaler or albuterol liquids because albuterol is absorbed rapidly and does not undergo enterohepatic recirculation. If an animal ingests albuterol-containing tablets and is asymptomatic, then induce emesis by administering 3% hydrogen peroxide (2.2 ml/kg orally, repeat once if emesis does not occur the first time) or apomorphine (into the conjunctival sac or intravenously [0.03 to 0.04 mg/kg]).[1] Then follow that with the administration of activated charcoal (2 to 3 g/kg orally).

Monitoring these patients' ECGs is also recommended, as some animals can develop ventricular premature contractions. If ventricular premature contractions are seen, lidocaine can be given intravenously at 2 to 8 mg/kg slowly followed by a constant rate infusion of 25 to 75 µg/kg/min in dogs. Use caution when giving this medication to cats since it can result in seizures and cardiovascular changes. Therapeutic doses in this species are 0.25 to 0.5 mg/kg slowly intravenously.[1]

Prognosis

The prognosis for dogs with albuterol toxicosis that receive prompt treatment is generally good. Clinical signs may persist for 24 to 48 hours, depending on the albuterol dose consumed. If the patient develops arrhythmias or has underlying cardiac disease, clinical signs may persist longer, and the prognosis may be guarded. VM

REFERENCES

1. Plumb DC. *Plumb's veterinary drug handbook*. 7th ed. Stockholm, Wisconsin: PharmaVet Inc, 2011.
2. Mensching D, Volmer PA. Breathe with ease when managing beta-2 agonist inhaler toxicoses in dogs. *Vet Med* 2007;102(6):369-373.
3. Brunton LL, Lazo JS, Parker KL. *Goodman & Gilman's the pharmacological basis of therapeutics*. 11th ed. New York: McGraw-Hill, 2006;164-167.
4. Olson J. *Clinical pharmacology made ridiculously simple*. 2nd ed. Miami, Florida: MedMaster Inc, 2003;86.
5. Rosendale M. Bronchodilators. In: Plumlee KH, ed. *Clinical veterinary toxicology*. St. Louis: Mosby, 2004;305-307.

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Canine intelligence from the pet owner's perspective—*and why we need to care*

Why they did it

Owners may better interpret canine behavior if they have an improved understanding of dogs' cognitive abilities. A group of researchers decided to investigate dog owners' perceptions of their dogs' intelligence.

What they did

Using an online survey, researchers collected data from 645 participants worldwide. Most respondents were women (90.1%) with a mean age of 41.9 years, and most were university-educated. Most respondents were born in Australia (61.5%); the United States (18.5%) and the United Kingdom (9.9%) were the next most frequently represented. Only data from owners currently living with a dog were included in the study, and most had lived with their dogs for at least three years.

In addition to demographic questions including level of education and location of primary dwelling, the survey included questions intended to "determine respondent beliefs with regard to whether dogs had an instinctive or learned ability to perform certain actions across several cognitive domains, including communication with humans, understanding of human attentional focus, problem solving learning and memory, social learning, means-end awareness, tool use, deception, mirror self-recognition, and empathy/emotional recognition." The final section of the survey was designed to assess the dog-owner relationship and perceived emotional closeness.

What they found

Overall, respondents agreed that dogs possess extensive social cognitive skills despite the fact that some of these, such as the belief that dogs are capable of recognizing human emotion, have not been demonstrated in scientific research. About one-quarter of respondents agreed or strongly agreed that dogs are smarter than most people. Owners who were emotionally close to their dogs and had a higher self-reported knowledge of dogs perceived dogs as having greater cognitive skills compared with people who were less close to their dogs. However, owners with higher self-reported knowledge of dogs thought dogs were *less* capable of instinctive problem-solving.

The researchers acknowledge some of the limitations of the study, such as not separating instinctive versus learned skills, which may have affected the scoring. The demographic data of the respondents may have also introduced bias and may make the data less applicable to the general public worldwide. In addition, since participants were recruited through social media and dog-related online forums, the data may be biased toward people who are very interested in canine cognition and behavior.

Take-home message

Inappropriate behavior is a common cause of relinquishment to animal shelters. A broader knowledge base of what is normal dog behavior as well as a greater understanding of owners' perceptions of that behavior will allow veterinarians and pet care givers to better educate the public about dog ownership.

Howell TJ, Toukhsati S, Conduit R, et al. The perceptions of dog intelligence and cognitive skills (PoDIaCS) survey. *J Vet Behav* 2013;8(6):418-424.

This "Journal Scan" summary was contributed by Jennifer L. Garcia, DVM, DACVIM, a veterinary internal medicine specialist at Sugar Land Veterinary Specialists & Emergency Care in Houston, Texas.

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ALL BUNGED UP: Unclogging the constipated cat

Uncomfortable for all involved, constipation in cats is solvable once you determine the cause—be it medical or behavioral. All the tools you need to unclog kitties are right here. *By Margie Scherk, DVM, DABVP (feline practice)*

Straining in the litter box—possibly even crying out or leaving unwelcome hard pellets around the home—constipated felines are uncomfortable. And constipation can interfere with a cat's appetite and even result in vomiting. Traditional approaches to this hard problem include administering enemas, laxatives to soften the stool or increase contractions, dietary fiber, and promotility agents. Could we be missing something really basic? And when should we be concerned about long-term effects of constipation?

CAUSES OF CONSTIPATION

Constipation is a clinical sign that is not pathognomonic for any particular cause. Most commonly, constipation is a result and sign of dehydration. The body is 65% to 75% water, depending on a cat's age and percent body fat. Homeostasis attempts to maintain a consistent cellular and extracellular environment. When cells become dehydrated, the body takes steps to correct the fluid deficit. Drinking more and concentrating urine are helpful, but once those capabilities have been maximized, water is reabsorbed in the colon, resulting in drier stool that is harder to pass. Bearing this in mind, medical therapy might not be the best initial therapeutic approach.

Other causes of constipation include problems that result in obstruction (either mechanical or functional), painful defecation, stress within the home environment (social or a dirty

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Client video

Dr. Scherk enlists your cat clients in watching out for their pets' health by discussing the signs of constipation they can look for at home. Scan the QR code below, or go to **dvm360.com/CloggedCatVideo**.

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Table 1
Processes resulting in constipation

Mechanism	Examples
Increased water loss	• Diuretic drugs • Polyuria from chronic kidney disease, diabetes mellitus, hyperthyroidism • Vomiting
Inadequate water intake	• Inadequate amount or quality of water available or lack of access to water (social stress or limited mobility) • Diet excessively dry or high in insoluble fiber • Painful drinking from orodental disease or difficulties swallowing
Painful defecation	• Degenerative joint disease; diseases of anal glands, prostate, rectum
Reluctance to defecate	• Social competition or fear of being ambushed • Unpleasant litter box (*e.g.* dirty, negative association with painful urination or defecation, inadequate size, covered box, dislike of litter type, suboptimal location) • Hospitalization
Obstruction—mechanical	• Intraluminal foreign body, neoplasia, stricture, polyp • Mural thickening (neoplasia, inflammation), intussusception, diverticulum, or hernia • Extra-intestinal compression by neoplastic or other mass, pelvic fracture, prostatic disease
Obstruction—functional	• Drugs resulting in decreased motility (*e.g.* opioids, barium, atropine) • Idiopathic megacolon • Ileus due to inflammatory disease • Spinal neoplasia • Electrolyte imbalance (hypercalcemia, hypokalemia, hypomagnesemia)
Metabolic disease	• Obesity • Hypothyroidism

The body is 65% to 75% water, depending on a cat's age and percent body fat.

toilet), and possibly metabolic disease (*Table 1*).

EVALUATING THE PATIENT

History

Given the myriad possible causes as well as concurrent problems, getting an appropriate history is very important. Clients may misinterpret stranguria as tenesmus. Not only is asking about the cat's current diet (type, frequency, appetite) important, but also be sure to ask questions to determine whether the patient might be dehydrated (due to decreased intake or increased water loss), may have orthopedic pain, or may be disinclined to use the litter box because of social or toileting factors (fear, unpleasant box). Download a client form with specific questions to ask to address these possible concerns at length at **dvm360.com/ConstipationForm**.

Mild constipation does not require a great deal of work-up or treatment, but identifying its causes is relevant for management to reduce the chance for progression. Chronic, recurrent constipation results in dilation of the colon and obstipation, which in some cats becomes irreversible, idiopathic megacolon that is refractory to cure due to loss of normal neuromuscular function (*see the sidebar "Chronic course of constipation," page 78*).[1]

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See brief summary on page 78

[1]Data on File at Merial.

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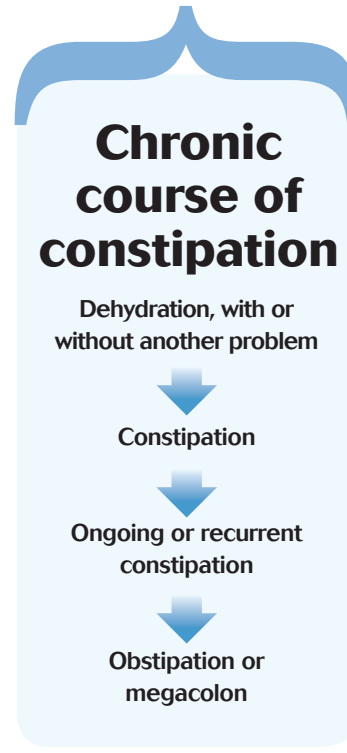
IMPORTANT SAFETY INFORMATION: For use in dogs only. The most common adverse reaction is vomiting. Other adverse reactions reported are dry/flaky skin, diarrhea, lethargy, and anorexia. The safe use of NexGard in pregnant, breeding, or lactating dogs has not been evaluated. Use with caution in dogs with a history of seizures.



Physical examination

On examination, hydration is assessed by assessing skin elasticity plus coat luster, mucous membrane moisture, and eye position (*Table 2*). Skin elasticity can be misleading in older patients (as well as young kittens) because of age-related changes in body water distribution, elastin, and collagen. Body weight, weight change relative to previous evaluation, body condition score (indicating percentage body fat), and muscle condition score (indicating protein adequacy) help determine progression of dehydration as well as amounts needed to rehydrate the individual.

Diagnostic testing

If a cat is experiencing its first episode of uncomplicated constipation, further testing may not be needed and therapeutic rehydration will likely be adequate. For recurrent constipation or when complications such as trauma or degenerative joint disease (DJD) or neurologic signs are present, additional steps are recommended. A minimum database consisting of a complete blood count (CBC), serum chemistry profile, total thyroxine (T_4) concentration measurement, and urinalysis should be performed to assess overall metabolic status and to get more information regarding the degree of dehydration.

Abdominal palpation reveals the presence of firm feces in the colon unless the feces is hidden in the pelvic rectum. Radiographs are required to confirm that the firm mass is intraluminal as well as to identify possible extraluminal problems such as obstructive masses or

orthopedic or skeletal problems. Spondylosis deformans of the lumbosacral vertebral column as well as pain from degenerative changes in the shoulders, elbows, hips, stifles, or hocks may limit mobility, making it harder to get to the litter box or to squat comfortably. Evidence of pelvic fracture or other poorly aligned fractures may be observed.

Table 2
Estimate of dehydration*

Degree of deficit relative to euhydrated state	Physical examination findings
Mild: About 5%	Slightly tacky mucous membranes or saliva, minimal loss of skin turgor, normal eye position
Moderate: About 8%	Dry mucous membranes, moderate loss of skin turgor, mildly sunken eyes
Severe: 10% or more	Extremely dry mucous membranes, skin not returning to original position when tented, severely sunken eyes, weak and thready pulses, tachycardia, hypotension, altered level of consciousness

*Source: Davis H, Jensen T, Johnson A, et al. 2013 AAHA/AAFP Fluid therapy guidelines for dogs and cats. *J Am Anim Hosp Assoc* 2013;49:149-159.

The steps in treating constipation in cats

Rehydrate the cat and maintain hydration.

Remove the feces by enema or manual extraction.

Modify the cat's diet (canned low residue diet, psyllium-enhanced dry diet).

Institute laxative therapy.

Administer promotility drugs.

Sedation may be helpful, allowing gentle manipulation of joints to assess whether range of motion is restricted or if pain is present. All cats with recurrent constipation should have a digital rectal examination. This helps to assess abnormalities of the anal glands, prostate, and pelvic inlet and the presence of rectal diverticulum, polyps, or other obstructive masses. Chronic tenesmus can result in perineal herniation.

Abdominal ultrasonography is useful to assess motility, to further examine abdominal structures, and to collect fine-needle biopsy samples of suspicious lesions. Colonoscopy may be required to biopsy mural or intraluminal masses. Computed tomography or magnetic resonance imaging may be used if an intrapelvic lesion is present or if neurologic deficits are present.

Cats with evidence of neurologic problems (*e.g.* paraparesis, hyporeflexia, urinary retention, regurgitation) should have a complete neurologic examination to rule out sacrocaudal dysgenesis (*e.g.* Manx breed), spinal neoplasia, or dysautonomia.

TREATING A CONSTIPATED CAT

There are five steps involved in relieving constipation in cats (*see the sidebar "The steps in treating constipation in cats" for an overview of the treatment process*).

Step 1: Rehydration

The cornerstone of therapy for constipation is rehydration and maintenance of a hydrated state. Fluid therapy for rehydration may consist of intravenous fluids, but subcutaneous therapy is generally adequate. The volume of fluid needed to correct the fluid deficit is

Case example: Fluid volume for deficit correction and hydration maintenance*

Patient: A 12-lb (5.4-kg) dehydrated cat with an approximately 5% deficit whose normal, hydrated weight is 13.3 lb (6 kg).

Deficit = 0.05 × 6 kg hydrated weight = 0.3 L = 300 ml
+ Maintenance = 60 ml/kg/day* × 6 kg = 360 ml
Total: 660 ml in first 24 hours

After rehydration, for maintenance: This rehydrated 13.3-lb (6-kg) cat needs 360 ml/day. If the cat eats canned food (5.5 oz/156 g with 80% water = 124 ml water), only an additional 236 ml of fluids are needed.

*Source: Davis H, Jensen T, Johnson A, et al. 2013 AAHA/AAFP Fluid therapy guidelines for dogs and cats. *J Am Anim Hosp Assoc* 2013;49:149-159.

based on the patient's previous hydrated weight. If not known, the total protein concentration in conjunction with packed cell volume may be helpful.

An isotonic polyionic fluid (*e.g.* lactated Ringer's solution) is appropriate for rehydration subcutaneously. A replacement solution such as Normosol-R (Hospira) or Plasma-Lyte 148 (Baxter) would be better choices should the intravenous route be used. A maintenance solution is preferable for ongoing maintenance therapy to prevent hypernatremia and hypokalemia, but if subcutaneous use results in discomfort, lactated Ringer's solution may be considered. The volume required for maintaining hydration is 60 ml/kg normal, hydrated weight/day (*see the sidebar "Case example: Fluid volume for deficit correction and hydration maintenance"*).[2]

Step 2: Feces removal

Removal of the feces with enemas or manual extraction may be done while the patient is being rehydrated. But do not start dietary therapy, prokinetic agents, and laxatives until the patient has been rehydrated. This is because dietary fiber and medical therapy increase fecal water or interfere with the colon's attempts to resorb water needed for cellular hydration.[3]

Administering smaller volumes (*e.g.* 35 ml) of warm water (or saline solution) mixed with 5 ml of mineral oil, glycerin, polyethylene glycol (PEG or PEG 3350), lactulose, or docusate sodium several times throughout a 24-hour period is safer and more effective than administering the entire volume as a bolus.[1] Because docusate sodium increases absorption of intraluminal contents into the bloodstream, it should not be administered concurrently with mineral oil.

Pediatric rectal suppositories can also be used (*e.g.* bisacodyl, docusate sodium). If the patient is anesthetized or sedated for rectal manipulation (digital examination, manual fecal extraction, or enema administration), use a cuffed endotracheal tube to prevent aspiration from vomiting.

Step 3: Dietary therapy

Soluble fibers (*e.g.* pectin, oligosaccharides) are capable of adsorbing (binding) water and forming a gel. Insoluble fibers increase fecal bulk, resulting in distention and reflex contraction. Both interfere with water reabsorption into the body and should only be considered when a patient is well-hydrated. Different fiber sources have different soluble:insoluble proportions.

Fibers can also be characterized by differences in fermentability. This refers to the ability of intestinal bacteria to produce short-chain fatty acids (SCFA) and gas from the fiber. Moderately fermentable fibers such as beet pulp are preferable to a highly ferment-

able, high-gas-forming fiber source.[4-6] SCFAs are vital as an energy source for colonocytes and are key in motility.

While a psyllium-enhanced dry diet has been shown to be effective in treating constipation,[7] increasing water intake by including wet foods and increasing desirable water stations in the home is beneficial. As with all things in cats, individualization is critical. Regardless of which diet is chosen, reassess the patient to ensure that the diet is having the desired effect.

Step 4: Laxative administration

Cathartics are agents that increase colonic motility. They include hyperosmotic laxatives such as polysaccharides (*e.g.* lactulose) and PEGs or those that irritate and stimulate the mucosa (*e.g.* vegetable oils, sennoside, glycerin).

True laxatives act by other mechanisms. Lubricating laxatives (*e.g.* mineral oil, hairball remedies) impair water absorption from the colon into the body; emollient laxatives (*e.g.* anionic detergent such as docusate sodium) enhance absorption of lipid into the body, but impede water absorption into the body; bulk-forming laxatives (*e.g.* cellulose or poorly digestible polysaccharides such as cereal grain) increase fecal bulk, fermentation, and viscosity.

Step 5: Promotility drug administration

Consider promotility drugs after other therapies have been instituted and shown to be insufficient. Cholinergic agents (*e.g.* bethanechol) have undesirable side effects and cannot be

Key point: Stretching or irritation of the colon may result in vomiting. A cuffed endotracheal tube should be in place when administering enemas, manipulating feces, or examining a cat's rectum under anesthesia.

recommended.[8] Drugs affecting serotonin 5-HT4 receptors (*e.g.* cisapride, mosapride, prucalopride, tegaserod) have been used to effect.[9-11] These should be given orally, as the transdermal route fails to deliver therapeutic levels.[11] Experimentally, nizatidine and ranitidine inhibit anticholinesterase activity, acting synergistically with cisapride.[12]

If the patient has concurrent medical problems, it may be receiving other medications that might exacerbate constipation. These include those that increase dehydration, such as diuretics, and those that interfere with intestinal motility, such as anticholinesterase and sympathomimetic agents, barium, opioids, tricyclic antidepressants, and some H_1-antihistamines.

WHAT ROLE DOES THE ENVIRONMENT PLAY?

A basic environmental need is to have multiple but separated resources.[13] These include duplicates each of water, food, litter boxes or outside latrines, perches, resting areas, and toy stations. By having multiple sites, separate from each other, the chance of intercat aggression or threat (perceived or real) from other individuals is minimized. Having unhooded litter boxes is important to eliminate the risk of ambush.

Litter boxes need to be large (at least 1.5 times the length of the cat) and very clean. The litter boxes—and all resource stations—need to be easy to access, especially for a cat that is mobility-restricted (*e.g.* due to DJD).

Water stations must also be kept clean and freshened regularly. Feeding small amounts of food frequently results in cats drinking a greater volume of water.[14] Wet food increases water intake significantly, favoring a positive hydration status.

TO CUT IS TO CURE?

Colectomy should be considered a "last resort" for a cat with megacolon that is refractory to medical management and has been struggling with obstipation for more than six months. If pelvic trauma resulting in malunion occurred more than six months earlier, colectomy is likewise justified.

Should pelvic trauma have occurred less than six months ago, however, pelvic osteotomy may be all that is required to prevent megacolon from developing in cats.

Colectomy is a procedure with significant potential complications and should be referred to a surgeon with advanced soft tissue and anastomosis skills whenever it's possible.

SUMMARY

Early correction and management of constipation will help prevent irreversible problems from developing. The effects of all drugs and dietary manipulations depend on the patient being adequately hydrated. Behavioral and environmental aspects should not be overlooked.

Clean, attractive litter boxes that are safe and easy to access not only enhance a positive quality of life but also prevent retention of feces or inappropriate elimination.

Regular follow-up is very important. Assessing the effect of the recommendations on the individual and making adjustments as warranted will provide the best outcome. VM

Margie Scherk, DVM, DABVP
(feline practice)
catsINK
Vancouver, Canada

View the references for this article at **dvm360.com/CatConstipation**.

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Clinic form

Don't forget to download a client form for collecting a history in cats with constipation at **dvm360.com/ConstipationForm**.

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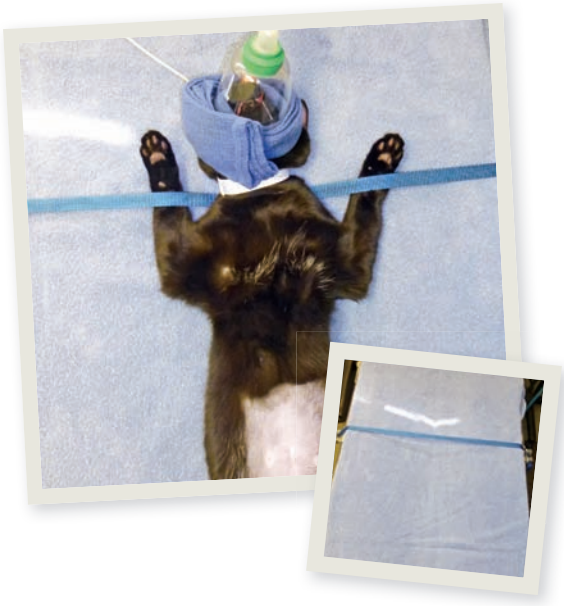

For a *quick* tie down, use a **leash**

For a quick tie down for a cat undergoing abdominal surgery, place a leash across the table at the point where the cat's neck will be, with the ends of the leash secured to the table. Place the cat on the table with its neck and legs on top of the leash, and then tuck the legs under the leash. The cat's weight is sufficient to hold the legs and keep the patient in dorsal recumbency. The whole process takes about five seconds!

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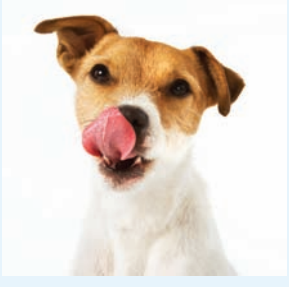

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Simbadol™ (buprenorphine injection)

1.8 mg/mL

For subcutaneous use in cats

BRIEF SUMMARY: Before using SIMBADOL, please consult the full prescribing information, a summary of which follows.

CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

HUMAN SAFETY WARNING

Abuse Potential
SIMBADOL contains buprenorphine (1.8 mg/mL), an opioid agonist and Schedule III controlled substance with an abuse potential similar to other Schedule III opioids. Buprenorphine has certain opioid properties that in humans may lead to dependence of the morphine type. Abuse of buprenorphine may lead to physical dependence or psychological dependence. The risk of abuse by humans should be considered when storing, administering and disposing of SIMBADOL. Persons at increased risk for opioid abuse include those with a personal or family history of substance abuse (including drug or alcohol abuse or addiction) or mental illness (suicidal depression).

Life-Threatening Respiratory Depression
Respiratory depression, including fatal cases, may occur with abuse of SIMBADOL.

Additive CNS Depressant Effects
SIMBADOL has additive CNS depressant effects when used with alcohol, other opioids, or illicit drugs that cause central nervous system depression.

Accidental Exposure
Because of the potential for adverse reactions associated with accidental injection, SIMBADOL should only be administered by veterinarians or veterinary technicians who are trained in the handling of potent opioids.

See Human Safety for detailed information.

INDICATION: SIMBADOL is indicated for the control of postoperative pain associated with surgical procedures in cats.

DOSAGE AND ADMINISTRATION: The dosage of SIMBADOL is 0.24 mg/kg (0.11 mg/lb) administered subcutaneously once daily, for up to 3 days. Administer the first dose approximately 1 hour prior to surgery. Do not dispense SIMBADOL for administration at home by the pet owner (see Human Safety).

CONTRAINDICATIONS: SIMBADOL is contraindicated in cats with known hypersensitivity to buprenorphine hydrochloride or any of the components of SIMBADOL, or known intolerance to opioids.

WARNINGS: For subcutaneous (SQ) injectable use in cats.

Human Safety: **Not for use in humans. Keep out of reach of children.** Because of the potential for adverse reactions, hospital staff should avoid accidental exposure and contact with skin, eyes, oral or other mucous membrane during administration. SIMBADOL contains buprenorphine, a mu opioid partial agonist and Schedule III controlled substance with an abuse potential similar to other Schedule III opioids. SIMBADOL can be abused and is subject to misuse, abuse, addiction and criminal diversion. SIMBADOL should be handled appropriately to minimize the risk of diversion, including restriction of access, the use of accounting procedures, and proper disposal methods, as appropriate to the clinical setting and as required by law. Abuse of SIMBADOL poses a hazard of overdose and death. This risk is increased with concurrent abuse of alcohol and other substances including other opioids and benzodiazepines. Buprenorphine has been diverted for non-medical use into illicit channels of distribution. All people handling opioids require careful monitoring for signs of abuse. Drug abuse is the intentional non-therapeutic use of a prescription drug for its rewarding psychological or physiological effects. Abuse of opioids can occur in the absence of true addiction. Naloxone may not be effective in reversing respiratory depression produced by buprenorphine. The onset of naloxone effect may be delayed by 30 minutes or more. Doxapram hydrochloride has also been used as a respiratory stimulant.

PRECAUTIONS: Hyperactivity (opioid excitation) has been observed up to 8 hours after anesthetic recovery (see ADVERSE REACTIONS). Safety has not been evaluated in moribund cats. Use in such cases should be based on the risk-benefit assessment of the veterinarian. Use with caution in cats with impaired hepatic function. The use of SIMBADOL has not been evaluated in breeding, pregnant, or lactating cats, or in cats younger than 4 months of age.

ADVERSE REACTIONS: In two controlled field studies, the following adverse reactions were reported.

Adverse Reactions in Two Field Studies

	SIMBADOL (N = 224)		Control (N = 226)	
Adverse Reaction[a]	**During Surgery[b]**	**After Surgery**	**During Surgery[b]**	**After Surgery**
Hypotension[c]	68 (30.4%)	51 (22.8%)	60 (26.5%)	40 (17.7%)
Tachycardia[d]	55 (24.6%)	73 (32.6%)	30 (13.3%)	44 (19.5%)
Hypothermia (≤98.0°F)	38 (17.0%)	1 (0.4%)	47 (20.8%)	0
Hyperthermia (≥103.0°F)	1 (0.4%)	91 (40.6%)	0	33 (14.6%)
Hypertension[e]	10 (4.5%)	40 (17.9%)	17 (7.5%)	18 (8.0%)
Anorexia	0	40 (17.9%)	0	35 (15.5%)
Hyperactivity	0	26 (11.6%)	0	11 (4.9%)
Reduced SpO_2 (≤90%)	8 (3.6%)	1 (0.4%)	11 (4.9%)	0
Bradycardia (≤90 beats/min)	5 (2.2%)	1 (0.4%)	4 (1.8%)	1 (0.4%)
Tachypnea (≥72 breaths/min)	0	5 (2.2%)	1 (0.4%)	6 (2.7%)
Arrhythmia	1 (0.4%)	1 (0.4%)	2 (0.9%)	0
Blindness	0	2 (0.9%)	0	1 (0.4%)
Apnea/Death	1 (0.4%)	1 (0.4%)	0	0
Ataxia	0	1 (0.4%)	0	0
Hyperesthesia	0	1 (0.4%)	0	0

a. Cats may have experienced more than one type or occurrence of an adverse reaction. Cats experiencing the same reaction both during and after surgery are presented in both time periods.
b. During surgery is the time from the administration of the anesthetic induction agent until discontinuation of the gas anesthetic.
c. Hypotension is defined as a mean blood pressure of ≤60 mmHg during surgery and ≤90 mmHg after surgery.
d. Tachycardia is defined as a heart rate of ≥180 beats per minute during surgery and ≥200 beats per minute after surgery.
e. Hypertension is defined as a mean blood pressure of ≥120 mmHg during surgery and ≥160 mmHg after surgery.

To report suspected adverse events, contact Abbott Animal Health at 1-888-299-7416, FDA at 1-888-FDA-VETS or FDA online at http://www.fda.gov/AnimalVeterinary/SafetyHealth.

EFFECTIVENESS: The effectiveness of SIMBADOL was demonstrated in two randomized, masked, placebo-controlled, multi-site field studies involving client-owned cats of various breeds. A descriptive, interactive pain assessment system was used by the trained assessor over the 72-hour post-operative period to determine pain control, and treatment success was defined as a cat that completed the 72-hour post-operative period without rescue analgesia. A statistically significant difference ($P \leq 0.005$) in the number of successes in the treatment group over the placebo control group was observed. The results of two field studies demonstrate that SIMBADOL is effective and has an acceptable safety margin for the control of postoperative pain in cats.

HOW SUPPLIED: SIMBADOL (buprenorphine injection) is supplied in a carton containing one 10 mL amber glass vial. Each multidose vial contains 1.8 mg/mL of buprenorphine.

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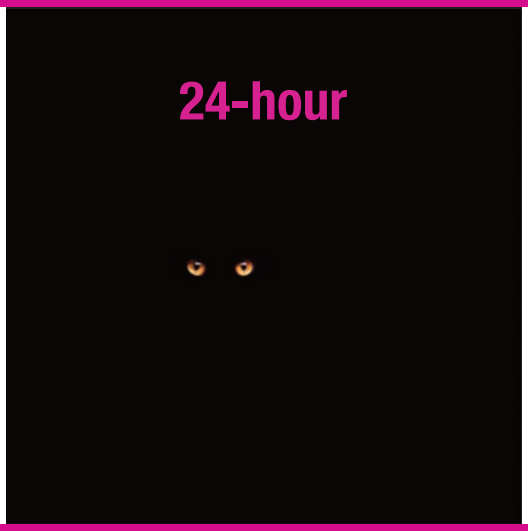

surgical pain control

- The first and only buprenorphine **FDA approved for cats**
- Demonstrated safety and efficacy in **more than 200 cats** treated with SIMBADOL
- Up to 3 once-daily subcutaneous doses for a **total of 72 hours of pain control**

INDICATION: SIMBADOL is indicated for the control of postoperative pain associated with surgical procedures in cats.

IMPORTANT SIMBADOL (buprenorphine injection) SAFETY INFORMATION

WARNINGS, PRECAUTIONS and CONTRAINDICATIONS: Due to serious human safety and abuse concerns, including physical or psychological dependence, life-threatening respiratory depression and additive CNS depressant effects, read the full prescribing information before using this drug, including the complete Boxed Warning. Not for use in humans. Hospital staff should be trained in the handling of potent opioids and should avoid accidental exposure. For subcutaneous (SQ) injectable use in cats. Opioid excitation has been observed up to 8 hours after anesthetic recovery. Use with caution in cats with impaired hepatic function. SIMBADOL has not been evaluated in breeding, pregnant, or lactating cats, in cats younger than 4 months of age or moribund cats. Do not use in cats with known hypersensitivity to buprenorphine hydrochloride or any of the components of SIMBADOL, or known intolerance to opioids.

ADVERSE REACTIONS: In two controlled field studies, the most frequent adverse reactions with SIMBADOL were hypotension, tachycardia, hypothermia, hyperthermia, hypertension, anorexia, and hyperactivity. Less frequent but serious adverse reactions included two deaths following apnea and two reports of presumptive post-anesthetic cortical blindness. See the full prescribing information for a complete list and additional details of adverse reactions for each field study.

See the Brief Summary of full prescribing information, including the complete Boxed Warning for human safety, on following page.

See brief summary on page cv3

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