

Fluid and Electrolyte Therapy During Vomiting and Diarrhea



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KEYWORDS

• Dehydration • Vomiting • Diarrhea • Fluid therapy • Small animals • Gastroenteritis

KEY POINTS

- Fluid therapy is the most important therapeutic measure in a pet suffering from dehydration caused by gastrointestinal losses (vomiting and diarrhea).
- Fluid therapy should be tailored to the patient's history, presenting complaint, physical examination, and laboratory findings; it is specific to the patient's needs and is modified based on the physical and laboratory findings until fluid therapy resuscitation end points are achieved.
- The selection of fluid replacement should be determined by serum electrolytes and blood gas analysis.

INTRODUCTION

The 2014 the Pet Health Report from Banfield Pet Hospital¹ summarized a comprehensive meta-analysis of a veterinary population consisting of 2.3 million dogs and approximately 470,000 cats. This health report provided information that revealed gastrointestinal consultations as the main reason for large breed dogs to visit the veterinary office in 2014. From this report, it could also be clearly appreciated that gastroenteritis represents an average of 4% of all canine cases that present to the veterinary hospital on any given day with colitis or large bowel diarrhea representing between 3% and 6% of the working diagnoses.

VOMITING

Vomiting is a complex reflex that leads to the forceful expulsion of stomach contents through the mouth and requires the coordination of the gastrointestinal, musculoskeletal,

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and nervous systems. Many structures are involved in the vomiting process. These include the emetic center located in the reticular formation of the medulla oblongata, the chemoreceptor trigger zone located on the floor of the fourth ventricle within the brain, and the vagal and sympathetic neurons stimulated by receptors in the abdominal viscera.² Activation of the vomiting reflex can occur for many reasons. These include local or systemic inflammation, irritation, distention, hypertonicity, emetogenic substances including toxins and medications (eg, apomorphine, nonsteroidal anti-inflammatory drugs, some antineoplastic agents), and impulses that arise from the vestibular center because of motion sickness.³

The color of vomitus helps the clinician identify its origin. Clear vomitus constitutes swallowed saliva from the stomach, yellow represents reflux of digested bile from the stomach, and green coloration suggests undigested bile originating from the upper duodenum caused by an obstruction or ileus. A brown fluid with a fetid odor is most likely from the small intestines and suggests a total obstruction or generalized ileus. In the case of primary gastrointestinal disease, the presence of blood in the vomitus typically appears as a red-tinged fluid or as “coffee grounds.” Streaks or flecks of blood within clear vomitus may come from gastric or esophageal irritation and is not of specific pathology.⁴

Patients that present for vomiting display a wide constellation of clinical signs that vary from vague to pathognomic for a particular condition or etiology (**Box 1**). The diagnostic dilemma is to unveil the inciting cause, treat and correct it, while at the same time treating all secondary complications related to the vomiting. In cats, vomiting is a particularly common and complex problem. Adult cats often have different and more chronic causes of vomiting than kittens. Nonetheless, the condition remains a common reason for cats to be presented for veterinary care.⁵ In domestic cats, vomiting is caused by primary gastrointestinal diseases and extragastrointestinal diseases. Examples of primary disease include infectious, inflammatory, parasitic, obstructive (foreign body, trichobezoar, worm impaction), drug-related, or nutritional. Extragastrointestinal causes include endocrinopathies (eg, hyperthyroidism); metabolic disease (eg, renal failure); inflammatory diseases; and other disease processes, such as hepatopathy, pancreatitis, or neoplasia (especially alimentary lymphoma). This wide spectrum of potential causes of vomiting in cats increases the difficulty for the practitioner in making a definitive diagnosis.⁶

DIARRHEA

Diarrhea is the result of excess fecal water that may be from decreased intestinal absorption, increased intestinal secretion, or both. Most cases of diarrhea are mild and self-limiting requiring minimal diagnostic testing and symptomatic care, but for more severe cases, diagnostic testing and intensive therapy are warranted (**Box 2**). Small intestinal diarrhea typically results in a larger fecal volume and fluid, electrolyte, and protein loss, and acid-base abnormalities. Large bowel diarrhea is characterized by small volume, multiple defecations, with feces of a soft consistency, and the presence of mucus or fresh blood. Tenesmus may or may not be present. It is important to differentiate small bowel versus large bowel because it has a significant impact on the diagnostic and treatment plan. Most commonly, the duration of the diarrhea is subjectively classified as acute (<14 days) or chronic (>14 days). The mechanism of diarrhea in the feline and canine patient is divided into four subcategories and these can occur alone or in any combination: (1) secretory diarrhea, (2) osmotic diarrhea, (3) increased intestinal permeability, and (4) abnormal gastrointestinal motility.^{7,8} Secretory diarrhea results when there is a disturbance to the ion pumps in the gastrointestinal epithelium

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