

MANAGEMENT OF ACUTE VOMITING & DIARRHOEA – WHICH DIET, WHY, WHEN, HOW?

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In veterinary hospitals around the globe, gastrointestinal (GI) problems are one of the most common reasons pet owners bring their pet to the hospital. The main challenge to the veterinary healthcare team presented with a pet that has GI dysfunction, is to determine whether this is an emergency or potentially serious problem versus a chronic or intermittent problem. The GI tract is known for its resiliency and the veterinary healthcare team has seen countless pets with clinical signs of acute vomiting and/or diarrhoea resolve uneventfully, sometimes without any supportive care. However, this cannot be held to all acute GI events as some may be life-threatening disorders, which if not identified and treated, could lead to poor patient management and/or death of the pet.

Vomiting is a clinical sign seen frequently in small animals and vomiting is associated with GI disorders; however, vomiting may occur with nongastrointestinal conditions as well. Thus it is difficult to identify the aetiology of the vomiting and may require extensive diagnostic workup in some dogs and cats. Vomiting is the forceful discharge of ingested material from the stomach and sometimes proximal small intestines. Vomiting truly consists of three stages: nausea, retching, and subsequently vomiting. Nausea is the first stage. Outward signs of nausea for which the healthcare team should be aware, may include depression, shivering, hiding, yawning, and licking of the lips. Increased salivation and swallowing occur, subsequently lubricating the oesophagus. Retching often helps distinguish the episode from regurgitation, gagging, or coughing. Retching is the forceful contraction of the abdominal muscles and diaphragm. Negative intrathoracic pressure and positive abdominal pressure changes cause the movement of gastric contents into the oesophagus and out the mouth. This vomiting process is initiated by the central nervous system.

In addition to vomiting, diarrhoea is one of the most common reasons owners bring their pets to the veterinary hospital. Diarrhoea is the passage of faeces containing an excessive amount of water thus resulting in an abnormal increase in stool liquidity and weight. Patients may also experience an increase in the frequency of their defecation. This would lead to the broad description of too rapid evacuation of too loose stools. It is important for the veterinary technician to gain a thorough understanding of the owner's definition of diarrhoea as it may not be as accurate as the healthcare team's definition. This would incorporate a very involved discussion with the owner while gathering the history. Diarrhoea is the trademark sign of intestinal dysfunction. It is important for healthcare team members to determine acute from chronic problems when assessing animals with diarrhoea. Acute diarrhoea is typically the result of diet, parasites, or infectious disease (e.g., parvovirus, coronavirus, etc.). Chronic diarrhoea is termed as such when it has not responded to conventional therapy within a two to three week time frame.

The next step is to determine the origination of the diarrhoea – small intestine or large intestine. A thorough history by the veterinary nurse is again the best tool. Increased frequency of defecation resulting in larger than normal amounts of soft – to –watery stool is often seen in small bowel diarrhoea. Failure to lose weight or body condition is typically indicative of large bowel disease. Weight loss usually indicates small bowel disease although severe large bowel diseases such as malignancy, histoplasmosis, and pythiosis may result in weight loss. Animals with weight loss from severe large bowel disease usually have signs associated with colonic involvement such as faecal mucus, marked tenesmus, and hematochezia. Fresh blood (bright red in colour) in the stool or evidence that the pet is straining to defecate is indicative of a large bowel disorder. Hematochezia (bright-red blood) typically originates in the anus, rectum, or descending colon. Melena is described as coal tar black stools that result from digested blood. Melena may originate from the pharynx, lungs (coughed up and swallowed), oesophagus, stomach, or upper small intestine. Tarry stools are the result of bacterial breakdown of hemoglobin. Dyschezia is difficult and/or painful defecation. Tenesmus refers to persistent and/or prolonged straining, typically with no effect. Owners may mistake tenesmus with constipation, so it is important to question the owner further to determine which clinical sign truly is manifesting in their pet. Dyschezia and tenesmus are most often associated with large bowel disorders.

DIAGNOSIS

A complete history is the first step (and it is a crucial step) in trying to establish a cause for vomiting and diarrhoea. The signalment and history, as well as a description of the vomiting episodes, are important. First, one must determine whether the animal truly is vomiting. The healthcare team should differentiate the owner's report of vomiting from gagging, coughing, dysphagia, or regurgitation. The description of retching is characteristic for vomiting. Signalment may also be helpful. For example, young, unvaccinated pets are more susceptible to infectious disease, such as parvovirus. Vaccination status, travel history, previous medical problems, and the medication history should be determined. Many drugs can result in vomiting, such as nonsteroidal antiinflammatory drugs (NSAIDs), which are known to cause gastrointestinal ulceration and vomiting. The healthcare team member should also explore the possibility of toxin or foreign body ingestion and of other concurrent signs that often arise with systemic or metabolic disease. An example: polydipsia, polyuria, and weight loss are typical of vomiting associated with diabetic ketoacidosis or chronic kidney failure.

The history should then focus on the actual vomiting episodes. The duration, frequency, and relationship of the episodes to eating or drinking should be ascertained. A complete physical description of the vomited material should be documented. A dietary history, including the type of diet or recent dietary changes, is important because vomiting may be associated with an adverse reaction to food. Vomiting of an undigested or a partly digested meal more than 6 to 8 hours after eating, a time at which the stomach should normally be empty, suggests a gastric outflow obstruction or gastric hypomotility disorder. The description of the vomit should include the volume, colour, consistency, odour, and the presence or absence of bile or blood. Undigested food suggests a gastric origin, whereas vomit-containing bile makes a gastric outflow obstruction unlikely. Vomit having a fecal odor is suggestive of a low-intestinal obstruction or bacterial overgrowth in the small intestine. Hematemesis, (either as fresh, bright-red blood or as digested blood with the appearance of coffee grounds), is indicative of gastrointestinal erosion or ulceration. Gastric ulceration is caused by metabolic conditions such as hypoadrenocorticism, reaction to certain drugs, clotting abnormalities, gastritis, or neoplasia.

A complete physical examination should begin with an evaluation of the mouth and oral cavity. The presence of a fever is suggestive of an infectious or inflammatory process. Bradycardia or cardiac arrhythmias in a vomiting animal may be a sign of a metabolic disturbance, such as hypoadrenocorticism. Careful palpation of the abdomen should be part of the physical examination to rule out; distension or tympany (e.g., gastric dilatation–volvulus [GDV] syndrome), effusion (e.g., peritonitis), masses or organomegaly (e.g., neoplasia, intussusception, or foreign body), and pain (e.g., peritonitis, pancreatitis, or intestinal obstruction). Obstruction is suggested when there are gas- and fluid-filled intestines, whereas bunching of the bowel is characteristic of intestinal plication from a linear foreign body obstruction. A rectal examination provides characteristics of colonic mucosa and faeces. Melena suggests upper-gastrointestinal bleeding while the presence of foreign material in the faeces supports a possible foreign body etiology.

Performing a complete blood count (CBC) is extremely important for GI patients, especially in those animals at risk for neutropenia (e.g., parvoviral enteritis), infection, and anemia (e.g., melena, hemataemesis). Patients should also have a serum chemistry profile performed upon presentation. A serum biochemistry profile, especially in patients presenting with severe vomiting, diarrhoea, ascites, unexplained weight loss, and/or anorexia should include alanine transaminase, alkaline phosphatase, blood urea nitrogen, creatinine, total protein, albumin, total CO₂, cholesterol, calcium, phosphorous, magnesium, bilirubin, and glucose concentrations, along with electrolytes; sodium, chloride, and potassium.

Vomiting may result in significant fluid, electrolyte, and acid-base alterations. The most common electrolyte disturbance in vomiting cats and dogs is hypokalemia. Acid-base changes generally are minimal or, if abnormal, tend toward an acidosis. If metabolic alkalosis is identified and is associated with hyponatremia, hypochloremia, and hypokalemia, the most likely cause will be gastric outflow or high-duodenal obstruction. Rarely animals with gastrinomas or with frequent and unrelenting vomiting have a metabolic alkalosis. When routine diagnostic testing fails to identify an obvious etiology, additional tests may be necessary. Additional tests may include viral or heartworm serology, thyroid hormone testing, adrenocortical testing for hypoadrenocorticism, bile acid determination for liver disease, toxicologic testing (e.g., lead poisoning), and a neurologic examination.

When testing fails to identify a nongastrointestinal cause for the vomiting, the focus should move to investigation of gastrointestinal disease as a possible etiology. The diagnostic approach includes contrast radiography, ultrasonography, endoscopy, or laparotomy. Frequently, inflammatory gastrointestinal lesions are a cause of chronic vomiting; these conditions include chronic gastritis, *Helicobacter* gastritis, inflammatory bowel disease

(IBD), and chronic colitis. Cats with inflammatory bowel disease often have vomiting as the main clinical sign and diarrhoea as a minor clinical component. Conditions such as gastric antral pyloric mucosal hypertrophy, antral polyps, foreign bodies, or neoplasia can cause gastric outflow obstruction. These conditions cause gastric retention and vomiting. Such gastric lesions can be easily identified endoscopically or using contrast radiography.

KEY NUTRITIONAL FACTORS

Following a diagnosis by the veterinarian, the vomiting and/or diarrhoea will need to be managed. The healthcare team should be cognizant of key nutritional factors and their impact when managing a patient nutritionally. Nutritional management of patients suffering with vomiting and/or diarrhoea should consider the following nutritional factors:

Water - Water is extremely important when working with patients with acute vomiting due to the potential for life-threatening dehydration from excess fluid loss and inability of the patient to replace the lost fluid. Patients with persistent nausea and vomiting should be supported with subcutaneous or intravenous rather than oral fluids. Where applicable, moderate to severe dehydration should be corrected with appropriate parenteral fluid therapy.

Electrolytes - Gastric and intestinal secretions differ from extracellular fluids in electrolyte composition, so their loss can result in systemic electrolyte abnormalities. Dogs and cats presenting with vomiting and diarrhoea may have abnormal serum potassium, chloride and sodium concentrations. Serum electrolyte concentrations are useful in tailoring appropriate fluid therapy and nutritional management of these patients. Mild hypokalemia, hypochloremia and either hypernatremia or hyponatremia are the electrolyte abnormalities most commonly associated with acute vomiting (and diarrhoea). Initially, electrolyte disorders should be addressed and corrected with appropriate parenteral fluid and electrolyte therapy. Patients experiencing vomiting and/or diarrhea should begin nutritional therapy ideally containing levels of potassium, chloride and sodium above the minimum allowances for normal dogs and cats. Recommended levels of these nutrients are 0.8 to 1.1% potassium (dry matter [DM]), 0.5 to 1.3% DM chloride and 0.3% to 0.5% DM sodium).

Protein – Nutritional therapy for patients exhibiting vomiting and/or diarrhoea should probably not provide excess protein (no more than 30% for dogs and 40% for cats). Products of protein digestion (peptides, amino acids and amines) increase gastrin and gastric acid secretion. “Hypoallergenic” or elimination foods for patients with vomiting/diarrhoea have been recommended as dietary antigens are suspected to play a role in the etiopathogenesis.

Ideal elimination foods should: 1) avoid protein excess (16 to 26% for dogs; 30 to 40% for cats), 2) have high protein digestibility ($\geq 87\%$) and 3) contain a limited number of novel protein sources to which the patient has never been exposed. On the other hand a food containing a protein hydrolysate may be utilized in nutritional management of the patient.

Fat - Solids and liquids higher in fat empty more slowly from the stomach than comparable foods with less fat. Fat in the duodenum stimulates the release of cholecystokinin, which delays gastric emptying. Foods with less than 15% DM fat for dogs and less than 25% DM fat for cats are appropriate for dietary management.

Fibre - Foods containing gel-forming soluble fibres should be avoided in vomiting and/or diarrhoea patients as these fibres increase the viscosity of ingesta and slow gastric emptying. These fibres include pectins and gums (e.g., gum arabic, guar gum, carrageenan, psyllium gum, xanthan gum, carob gum, gum ghatti and gum tragacanth). Overall, the crude fibre content should not exceed more than 5% DM.

Food Form and Temperature - Moist foods are considered to be the best form since they reduce gastric retention time. For the same reason, the veterinary healthcare team should educate clients to warm foods to between room and body temperature (70 to 100°F [21 to 38°C]).

Vitamins and Trace Minerals - Iron, copper, and B vitamins may benefit patients with gastro duodenal ulceration and GI blood loss. Hematinics should be used in patients with nonregenerative, microcytic/hypochromic anaemia's attributable to iron deficiency. However, they probably are not necessary in most animals that have received a blood transfusion.

Acid Load - Alkalemia should be expected if vomiting patients lose hydrogen and chloride ions in excess of sodium and bicarbonate. Hypochloremia perpetuates the alkalosis by increasing renal bicarbonate reabsorption. A common finding is mild alkalemia in vomiting patients; however profound alkalemia is more likely to occur with pyloric or upper duodenal obstruction. Acidemia may occur in vomiting patients if the vomited gastric fluid is relatively low in hydrogen and chloride ion content (e.g., during fasting) or if concurrent loss of intestinal sodium and bicarbonate occurs. It is best to correct severe acid-base disorders with parenteral fluid and electrolyte therapy. Foods for patients with acute vomiting and diarrhoea should avoid excess dietary acid load. Foods that normally produce alkaline urine are less likely to be associated with acidosis.

Vomiting and diarrhoea are two of the main reasons owners bring their pets to the hospital. It is essential for veterinary nurses to identify these clinical signs and perform a complete history and evaluation regarding these frequent signs in presenting pets. Nutritional management is a crucial part of therapy in the management of vomiting and/or diarrhoea. Certain key nutritional factors play a role in managing vomiting and diarrhea in cats and dogs – through enteral and parenteral nutrition – and veterinary nurses should recognize the circumstances and reasoning for the KNF's to insure a positive outcome for the vomiting and diarrheic patient.

REFERENCES – SUGGESTED READING

- Hall, EJ, German, AJ. 2010. Diseases of the small intestine. In *Textbook of Veterinary Internal Medicine 7th edition*. Ettinger, SJ and Feldman, EC, editors. Pp. 1526 – 1572. Elsevier: St. Louis, MO.
- Burns, KM. Gastrointestinal Disorders. In *Internal Medicine for Veterinary Technicians*. Merrill L ed. 2012, Wiley-Blackwell, Ames, IA.
- Willard, Michael D. 2009. Disorders of the Intestinal Tract. In *Small Animal Internal Medicine 4th edition*, pp. 441-476. Mosby: St. Louis, MO.
- Tams, TR. 2003. Chronic Diseases of the Small Intestine. In *Handbook of Small Animal Gastroenterology 2nd Edition*. Tams, TR editor. Pp.211-250. Saunders: St. Louis, MO.
- Davenport DJ, Remillard RL. (2010a) Introduction to Small Intestinal Disease. In *Small Animal Clinical Nutrition 5th Ed*. Hand MS, Thatcher CD, Remillard RL, Roudebush P, Novotny BJ eds. 2010, pp 1047-1049. MMI, Topeka, KS;
- Davenport, DJ, Remillard RL. (2010b) Acute Gastroenteritis and Enteritis. In *Small Animal Clinical Nutrition 5th Ed*. Hand MS, Thatcher CD, Remillard RL, Roudebush P, Novotny BJ eds. 2010, pp 1053-1061. MMI, Topeka, KS;
- Allenspach, K, Gaschein, FP. 2008. Small Intestinal Disease. In *Small Animal Gastroenterology*. Steiner, JM editor. Pp. 187-202. Schlutersche: Germany.