Diagnosis of Acute and Chronic Vomiting in Dogs and Cats

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Vomiting is among the most common reasons that dogs and cats are presented for evaluation. Because there are a multitude of causes of vomiting, ranging from simple to complex, this can be a challenging problem for clinicians to accurately diagnose and manage. The problem also causes significant concern for pet owners, especially when there is an onset of frequent severe vomiting or when the occurrence becomes more chronic and intermittent without adequate control. However, by following a systematic approach beginning with an accurate history, a thorough physical exam, and appropriate baseline testing (Stage 1), then performing tests more specific for certain conditions or organ systems (e.g., bile acids assay, leptospirosis serology, baseline cortisol or ACTH stimulation, ultrasonography) (Stage 2), and finally where indicated performing advanced procedures for more thorough examination and biopsy or definitive therapy (endoscopy, exploratory laparotomy), most cases can be diagnosed successfully and managed judiciously. Vomiting does not constitute a diagnosis in itself. It is emphasized that vomiting is simply a clinical sign of any of a number of disorders that can involve any organ system in the body. In fact, one diagnostic registry service listed over 400 potential causes of vomiting in dogs! These notes summarize diagnostic approach and various treatment options for managing dogs and cats with vomiting.

Vomiting refers to a forceful ejection of gastric and occasionally proximal small intestinal contents through the mouth. The vomiting act involves three stages: nausea, retching, and vomiting. Serious consequences of vomiting include volume and electrolyte depletion, acid-base imbalance, and aspiration pneumonia.

It is essential that the clinician make a clear differentiation between regurgitation and vomiting at the outset. Regurgitation is defined as passive, retrograde movement of ingested material, usually before it has reached the stomach. Failure to recognize the difference between regurgitation and vomiting often leads to misdiagnosis. Regurgitation may occur immediately after uptake of food or fluids or may be delayed for several hours or more.

A Detailed, Accurate History is ESSENTIAL
One of the most important early considerations is to determine if any toxins or foreign objects may have been ingested. Some compounds can cause life threatening sequelae. The earlier a toxicity is identified, the greater the chance for successful management. Currently, xylitol toxicity is being recognized more frequently, and sago palm plants, which can cause severe hepatotoxicity in dogs and cats, are found in more homes and yards than in previous years. Cocoa mulch toxicity (theobromine) is also
occasionally seen. Many animals that have ingested toxins are presented with vomiting as a prominent sign.

**History and Clinical Assessment: Clinical Features Of Vomiting**

Because of the wide variety of disorders and stimuli that can cause it, vomiting may present the clinician with a major diagnostic challenge. A complete historical review with emphasis on all body systems is essential for determining a realistic and effective initial work-up plan and treatment protocol. All too often concentration on only the gastrointestinal tract leads to an incorrect diagnosis and inappropriate treatment. Consideration of the following features is useful in assessing and diagnosing a patient with vomiting:

1. duration of signs
2. signalment and past pertinent history
3. environment and diet
4. systems review (e.g., history of PU/PD, coughing and sneezing, dysuria or dyschezia, etc.)
5. time relation to eating (vomiting of undigested or partially digested food more than 8-10 hours after eating often indicates a gastric motility disorder [more common] or gastric outlet obstruction [less common])
6. content of the vomitus (food, clear fluid, bile, blood, material with fecal odor), and
7. type and frequency of vomiting (projectile?, chronic intermittent?, cyclic?, morning vomiting only?).

**Most Common Causes of Acute or Chronic Vomiting in Dogs**

**First need to Rule-Out:**

**Dietary/ingestive problem** (always investigate for any potential environmental materials that the patient may have been chewing on (plants [toxins], debris carpet, etc)

- Indiscretion (e.g., table scraps, sudden diet change, garbage ingestion; toxins, foreign body, ingesting plants in home or yard)
- Food adverse reaction (dietary sensitivity)
- True food allergy

**Parasites**

- Intestinal (including *Giardia*)
- Gastric (*Physaloptera*)

**Drug related problems**

- NSAIDS must always be considered
- Other drugs (e.g., cardiac glycosides, antibiotics, chemotherapeutic agents)
- *Any* drug can potentially cause vomiting, always ask about any supplements that are being given to a pet

**Metabolic disorders**

- Renal disease
Liver disease
- Electrolyte abnormalities
- Addison’s disease (some are glucocorticoid and mineralocorticoid deficient and will demonstrate typical electrolyte abnormalities; others are only glucocorticoid deficient and require ACTH stim for diagnosis (JAVMA April 15, 2007, p. 1190-1194)

Rule-Outs for Chronic Vomiting, Once the Causes Listed Above are Ruled Out:

Main Categories:
- Motility Disorders
  - Gastric hypomotility (an underappreciated disorder)
- Inflammatory Disorders
  - Chronic gastritis (with or without Helicobacter)
  - Inflammatory bowel disease
- Obstructive Disorders
  - Foreign body not already diagnosed (including cases with a partial small bowel obstruction that has eluded early diagnosis)
  - Hypertrophic gastropathy (uncommon)
- Neoplasia

Most Common Causes of Chronic Vomiting in Cats
- Dietary problem
  - Food adverse reaction (dietary sensitivity), up to 25% of cases
- IBD
- Hyperthyroidism
- Liver disease
- Renal disease
- GI lymphoma (intestinal is more common)
- Chronic pancreatitis
- Heartworm disease

Intermittent Chronic Vomiting
Chronic intermittent vomiting is a common presenting complaint in veterinary medicine. Often there is no specific time relation to eating, the content of the vomitus varies, and the occurrence of vomiting may be very cyclic in nature. Depending on the disorder, other signs such as diarrhea, lethargy, inappetence, and salivation (nausea) may occur as well. When presented with this pattern of clinical signs, the clinician should strongly consider chronic gastritis, inflammatory bowel disease, irritable bowel syndrome, and gastric motility disorders as leading differential diagnoses. A detailed work-up including gastric and intestinal biopsies is often required for definitive diagnosis in
these cases. It is important to note that chronic intermittent vomiting is a common clinical sign of inflammatory bowel disease in both dogs and cats.

Vomiting from systemic or metabolic causes may be an acute or chronic sign and generally there is no direct correlation with eating and no predictable vomitus content.

**Diagnostic Plan**

If reasonable concern is established based on the history (e.g., patient is inappetent, ingested a toxin, is vomiting frequently) or physical assessment (e.g., patient is listless, dehydrated, in pain), then a minimum data base of **CBC, complete biochemical profile** (or specific tests for evaluation of liver, kidney, pancreas, electrolytes), complete **urinalysis** (pre-treatment urine specific gravity extremely important for diagnosis of renal failure), and **fecal examination** is essential. The best way to screen for GI parasites on a single fecal sample is to run both a centrifugal flotation test and a **Giardia** antigen test. If only a single zinc sulfate centrifugal flotation is run, 25-30% of **Giardia** cases will be missed. **T4 and both a heartworm antibody test and heartworm antigen test** are considered routine baseline tests for vomiting cats (approximately 40% of cats with adult heartworms will have vomiting as a clinical manifestation of the disease). **Survey abdominal radiographs** are indicated if thorough abdominal palpation is not possible or suggests an abnormality (e.g., foreign body, pancreatitis, pyometra). Some institutions now routinely order 3 view abdomen films on patients presented for vomiting (both laterals and a VD). Unfortunately these tests are often not done early enough. Even if baseline results are unremarkable they are more than justified because they help to rule out serious problems at the outset (e.g., vomiting due to renal failure, diabetes mellitus, liver disease). Alternatively, any abnormalities provide direction for initial treatment and further diagnostics.

The decision for performing more in-depth diagnostic tests is based on ongoing clinical signs, response to therapy, and initial test results. These tests include **baseline cortisol** or **ACTH stimulation** to confirm hypoadrenocorticism in a patient with an abnormal Na:K ratio or to investigate for this disorder if electrolytes are normal, **complete barium series** or **BIPS study** (for gastric or intestinal foreign body, gastric hypomotility, gastric outflow obstruction, partial or complete intestinal obstruction), **cPLI** or **fPLI**(canine and feline lipase immunoreactivity, respectively, for diagnosis of pancreatitis in dogs and cats), and **serum bile acids assay** (to assess for significant hepatic disease). **Barium swallow with fluoroscopy** is often necessary for diagnosis of hiatal hernia disorders and gastroesophageal reflux disease. **Serum gastrin levels** are run if a gastrinoma (Zollinger-Ellison Syndrome) is suspected.

**Pancreatitis:** Pancreatitis continues to be a challenging disorder to accurately diagnose, short of thorough direct examination and biopsy. Assays for amylase and lipase are of very limited value, especially in cats. In general, the following can be stated regarding the various diagnostic tests for pancreatitis:
Value of the Various Diagnostic Tests for Pancreatitis

Amylase/Lipase (sensitivity on lipase depends on which specific test is being done)
- of value as a screening test in dogs only
- need to be 3x or > above normal reference range in order to suggest pancreatitis
- normal does not rule-out pancreatitis
- **new lipase assay from Antech (2 DGGR) approximates sensitivity of PLI for diagnosis of pancreatitis
- Antech has discontinued the somewhat less sensitive 1,2-diglyceride assay as of October 4, 2015. The new assay is 2 DGGR and is on every biochemical profile for dogs and cats (where lipase is normally included)

Abdominal Ultrasound
- highly specific, but not very sensitive, especially in cats

Serum PLI
- highly sensitive for pancreatitis

Pancreatic Lipase Immunoreactivity (cPLI and fPLI)
- Exocrine Pancreatic Insufficiency (EPI)
  o cPLI is reliably significantly decreased
  o cPLI is specific for EPI
- Chronic Renal Failure
  o Increased, but usually still within reference range
- Dogs with Biopsy Proven Pancreatitis
  o cPLI sensitivity is > 80%
  o currently recommended cutoff value for dogs is >200 ug/L
  o results are also promising for cats

Negative contrast gastrography.
An excellent technique to quickly evaluate the stomach for presence of a nonradiopaque foreign body.
Technique:
  Gastric tube, tranquilize as needed
    (definitely tranq cats)
  Dogs: 8-10 ml/lb air or stop if the animal shows discomfort
  Cats: 5 ml/lb air
  Remove tube, take rads immediately
    (left lateral, VD first)
  Can also use 60 ml carbonated beverage (e.g., Mountain Dew)
**BIPS are barium impregnated polyethylene spheres.** Traditionally, veterinarians have relied on barium liquid as the contrast agent of choice for gastrointestinal studies. However, recognized limitations of barium liquid have led to the development of barium-impregnated solid radiopaque markers for the diagnosis of motility disorders and bowel obstructions. Barium liquid contrast studies are of limited value in detecting hypomotility. Radiopaque markers can be used to investigate a number of common gastroenteric problems. These spheres have been specifically validated for use in dogs and cats and are the only radiopaque markers with which there is extensive clinical experience in veterinary medicine. BIPS are manufactured in New Zealand and are now available in many countries. Information on availability of this product, including instructions on use and interpretation of radiographic studies, can be found at (www.medid.com; 800-262-2399).

**Ultrasonography** can be useful in the diagnostic work-up of a number of disorders that can cause vomiting. Among the problems that may be detected with ultrasonography are certain disorders of the liver (e.g., inflammatory disease, abscessation, cirrhosis, neoplasia, vascular problems), gall bladder (cholecystitis, choledoliths, gallbladder mucocele), GI foreign bodies, intestinal and gastric wall thickening, intestinal masses, intussusception, kidney disorders, and others. Needle aspirations and/or biopsies can be done at many sites under ultrasound guidance.

One of the most reliable and cost efficient diagnostic tools currently available for evaluation of vomiting is **flexible GI endoscopy**. Endoscopy allows for direct gastric and duodenal examination, mucosal biopsy from these areas, and in many cases gastric foreign body retrieval. Endoscopy is considerably more reliable than barium series for diagnosis of gastric erosions, chronic gastritis, gastric neoplasia, and inflammatory bowel disease (a common cause of chronic intermittent vomiting in dogs and cats). It is stressed that biopsy samples should always be obtained from stomach and whenever possible small intestine regardless of gross mucosal appearance. Normal gastric biopsies may support gastric motility abnormalities, psychogenic vomiting, irritable bowel syndrome, or may be noncontributory (i.e., look elsewhere for diagnosis). Many dogs with vomiting due to inflammatory bowel disease have no abnormalities on gastric examination or biopsy. If only gastric biopsies are obtained, the diagnosis may be missed.

**Abdominal exploratory** is indicated for a variety of problems including foreign body removal, intussusception, gastric mucosal hypertrophy syndromes, procurement of biopsies, and for resection of neoplasia.

**fPLI** is available at Texas A&M University. Serum samples can either be sent directly to the GI Laboratory at Texas A&M University, or they can be forwarded to Texas A&M by a commercial laboratory.
Diagnosis of Vomiting

Stage 1—Baseline Assessment

- History and physical examination
- Conservative vs. more aggressive diagnostic plan based on patient’s condition and clinician’s concern

**Conservative Approach**
- Fecal examination
- Selected diagnostics
- Specific/symptomatic therapy

**Serious or Systemic Clinical Signs**
- Complete blood count
- Complete biochemical profile
- Urinalysis
- Fecal examination
- Parvovirus test if indicated
- Survey abdominal radiographs (3 views)
- T4 (cats)
- Heartworm antibody and antigen test (cats)
- Appropriate specific/supportive therapy

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**Stage 2—Further assessment** (if vomiting persists or initial tests indicate further investigation should be performed promptly):

- Special Blood Tests
—Corticotropin baseline or ACTH stimulation
—cPLI or fPLI (pancreatitis)
—Leptospirosis serology and/or lepto PCR
—Bile acids assay (to assess liver function)
—Coagulation tests (consider in patients with hematemesis/melena)

• **Contrast Radiography**
  —Barium contrast
  —Air contrast gastrogram (to further assess for gastric foreign body)
  —BIPS (barium-impregnated polyethylene spheres; with food to assess GI motility)

• **Ultrasonography**
  —Evidence of GI or non-GI disease
  —Aspirates or biopsy
  —Abdominocentesis

• **Nuclear Scintigraphy**
  —Transcolonic portal angiography for detection of portosystemic anomaly
  —GI motility study

**Stage 3—Invasive Procedures**

• **Flexible GI endoscopy**
  —Examination, biopsy, foreign body retrieval

• **Laparoscopy**
  —Biopsies (e.g., liver, pancreas)
  —Aspirates (e.g., gall bladder, lymph nodes, mass lesion)
  —Intestinal biopsy

• **Surgical intervention**
  —Therapeutic or exploratory with multiple biopsies

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*a*GI parasites, including *Giardia*, should always be considered in dogs with acute or intermittent vomiting. Best baseline testing on a single fecal sample includes centrifugal flotation and *Giardia* antigen test.
Endoscopy is a diagnostic or therapeutic tool that can be used in Stage 1, Stage 2, or Stage 3, depending on the clinical situation.

References


