

# Diagnosing GI foreign bodies

*A methodical approach to testing can determine the need for surgical intervention.*



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**D**iagnosing a gastrointestinal (GI) foreign body can be difficult for practitioners. Not only do Pets present with a variety of clinical signs, but clients often can't offer any information about whether the Pet ate a forbidden object.

The following two cases demonstrate the importance of conducting a thorough history and diagnostic evaluation to arrive at a definitive diagnosis of a gastrointestinal foreign body.

**Case 1:** Rush, a 9-month-old neutered male Labrador Retriever, presents with vomiting for the last 24 hours. The vomiting has been occurring more frequently but decreasing in volume. Rush has been your patient since his family brought him home seven months ago. His vaccinations are current, and he received a clean bill of health at his comprehensive physical examination two months ago. He also has not traveled or been boarded recently. His owners report that they have not changed Rush's diet, nor has he torn into the garbage or eaten any abnormal objects.

On physical examination, Rush has a

slightly elevated temperature of 103° F, his mucous membranes are pink but a little tacky and his cranial abdomen is a bit tender when palpated. On further questioning, the owners report that Rush had a diarrhea episode this morning at the same time that he vomited his breakfast. And finally, they state that they don't think Rush has been "quite himself" since yesterday afternoon.

**Case 2:** Penelope, a 5-year-old spayed female Shih Tzu, presents with frequent vomiting of one week's duration. This is the first time you have seen Penelope, and you learn that during the last three years, she has regularly vomited for no apparent reason. Her owners tell you that Penelope saw another doctor last year for the same problem. That veterinarian diagnosed Penelope with inflammatory bowel disease or chronic pancreatitis; blood work and survey abdominal radiographs at the time were unremarkable. The doctor had placed Penelope on a highly digestible, hypoallergenic diet and instructed her owners to discontinue all ingestible items, such as treats, rawhides and pig's ears. On physical examination, you find Penelope to be afebrile,

clinically well hydrated and experiencing no pain on abdominal palpation. The owners report no diarrhea currently, but occasionally after a bout of vomiting, Penelope has diarrhea the next day.

Both these Pets have gastrointestinal foreign bodies, and both will require surgery to remove them. But how do we, the veterinarians, progress from a history of vomiting to recommending surgery to the owners?

### What could they have eaten?

In dogs, anything goes. The relatively large size of the canine esophagus allows them to swallow objects much larger than what can safely pass through the intestines. The list of items that can present as gastrointestinal foreign bodies in dogs is endless, but the most common are bones, rocks, toys, plastic bags and other trash, socks, coins and leashes (*Figures 1A and 1B*, page 26).<sup>1-3</sup> The list of common foreign bodies in cats is much shorter, with trichobezoars and strings at the top of the list.<sup>2</sup>

Many of the aforementioned items are relatively innocuous outside the body. Once ingested, however, they can wreak havoc in the intestinal tract. Not only can foreign bodies cause obstruction, but some items, such as coins or objects containing lead, can cause systemic toxicosis. Others can cause local or regional damage to the intestine itself. Some foreign bodies, particularly pieces of string, can perforate the gastrointestinal tract and lead to subsequent peritonitis.<sup>3</sup> Some of these items may pass or can be coaxed through the gastrointestinal tract; however, some of them become lodged in the stomach or small intestine and need to be surgically removed.<sup>1</sup> The tricky part is figuring out that they are in there and are definitively the cause of the Pet's presenting signs.

### Table 1: Common Causes for Acute or Chronic Vomiting in Pets\*

#### Dietary issues

- Indiscretion
- Food sensitivity
- Food allergy
- Rapid change in diet

#### Gastric and intestinal parasites

#### Drug interaction or side effects

- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Antibiotics
- Cardiac glycosides
- Chemotherapeutic agents

#### Metabolic disorders

- Renal disease
- Liver disease
- Electrolyte abnormalities
- Addison's disease

#### Motility disorders

- Hypomotility
- Pyloric outflow obstruction

#### Inflammatory disorders

- Chronic gastritis
- Pancreatitis
- Inflammatory bowel disease

#### Neoplasia

**Toxin ingestion** (antifreeze, mushroom poisoning)

#### Viral infection

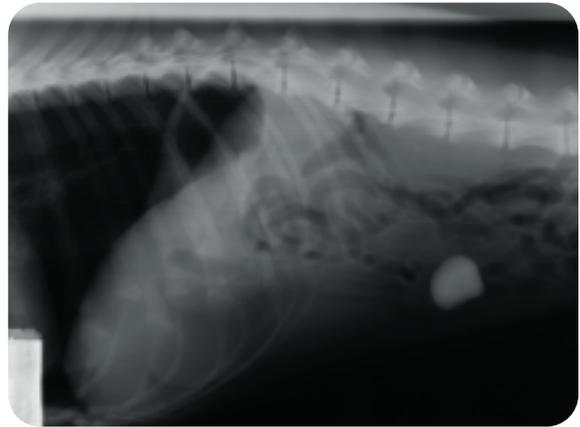
\* Tams TR. The vomiting dog—Diagnosis, in *Proceedings*. Atlantic Coast Veterinary Conference, 2001. Available at: [www.vin.com/VINDBPub/SearchPB/Proceedings/PR05000/PR00421.htm](http://www.vin.com/VINDBPub/SearchPB/Proceedings/PR05000/PR00421.htm). Accessed October 15, 2006.

Figure 1A



Vetrodorsal abdominal radiograph of an 11-month-old intact male Red Irish Setter with dense opacity in the left caudal abdomen. This opacity was a garden rock that was later removed from the jejunum. There is gas in the small intestine but no dilated loops are noted.

Figure 1B



Lateral abdominal radiograph of the same dog in Figure 1A with dense opacity in the mid-ventral abdomen.

### Reaching a diagnosis

Vomiting is the most common presenting complaint in Pets with gastrointestinal foreign bodies. Dehydration and lack of appetite, two other common signs, are also very nonspecific. Before diagnosing a foreign body, several other common causes of acute or chronic vomiting need to be ruled out (*Table 1*, page 25).

An organized approach to diagnosis in suspected gastrointestinal foreign body cases will help minimize unnecessary testing and will allow you to make an accurate, timely diagnosis.

To determine which tests to perform, address these primary considerations:<sup>2,4</sup>

- Signalment
- Acute vs. chronic nature of the clinical signs
- Frequency of vomiting
- Degree of clinical signs (mild, moderate, severe or life threatening)
- Physical examination findings

- Presence of clinical signs such as shock, melena or abdominal pain.

If you have properly assessed the Pet and still believe reasonable cause for concern exists, perform standard diagnostic tests to collect additional information. A complete blood count with differential, internal organ function tests, electrolyte profile, urinalysis and fecal examination are essential. If thorough abdominal palpation is not possible or suggests an abnormality, survey radiographs of the abdomen are also indicated. Perform these tests early. Even if the results are unremarkable, they can serve as a baseline and help rule out more serious problems, such as renal failure or liver disease. Abnormalities can help you decide whether to begin therapy or pursue further diagnostics.<sup>4</sup>

Gastrointestinal foreign bodies are often difficult to diagnose for a number of reasons. Clinical pathology findings may be normal in acute or asymptomatic cases.<sup>2</sup> However, some abnormal findings can point you in the right diagnostic direction. Common findings can include:<sup>1,2,4</sup>

- Hemoconcentration from dehydration
- Blood-loss anemia associated with GI ulceration

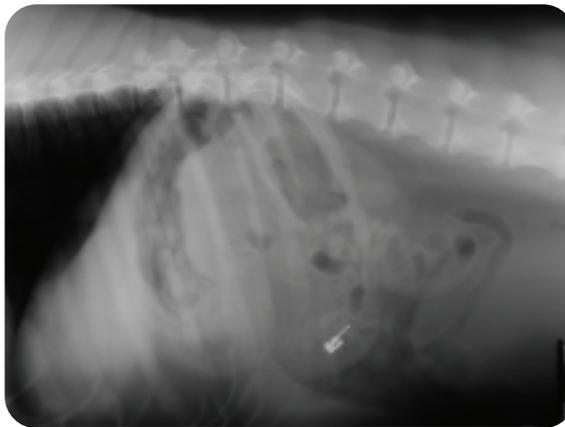
- Hemolytic anemia from zinc toxicity
- Leukocytosis from stress or inflammation
- Nucleated red blood cells from lead toxicity
- Prerenal azotemia secondary to dehydration
- Metabolic alkalosis (increased bicarbonate or total carbon dioxide) secondary to hydrogen ion losses
- Metabolic acidosis (decreased bicarbonate or total carbon dioxide) secondary to dehydration
- Electrolyte abnormalities, such as hypokalemia, hypochloremia, hyponatremia or hypernatremia.

### Getting a better picture

Abdominal survey radiographs can be unremarkable in many GI foreign body cases. Although radiographs are helpful, they are frequently only suggestive of a problem and only occasionally give a definitive answer (*Figure 2*). It is important to use radiographs to help identify key signs consistent with the presence of a foreign body. In the stomach, foreign bodies are usually observed because they differ in opacity from normal gastric contents. Specifically, a foreign body located in the pyloric region will be outlined by gas on the left lateral view.<sup>5</sup>

In the small intestine, the most common problem seen on survey radiographs is ileus, or the failure of intestinal contents to pass. There are two kinds of ileus: mechanical (or obstructive) and functional (or paralytic). In cases of GI foreign bodies, mechanical ileus is seen as focal, not uniform, areas of bowel dilatation (one to three bowel loops) proximal to the obstruction. Functional ileus tends to produce generalized, extensive and uniform distention and is generally not seen

Figure 2



Lateral abdominal radiograph of a 10-year-old neutered male Labrador Retriever who ingested a sports bra. Notice the metallic foreign body (zipper) in the intestines.

with GI foreign bodies except for chronic obstructions, but chronic obstructions in the distal small intestine can produce this lesion, too.<sup>5</sup> Normal small intestinal diameter in the dog is variable; a general guideline is the lumen should not be more than two times the width of a rib.<sup>5</sup> Since cats are less variable in size, the rule is more specific. The bowel diameter in a cat should not exceed 12 mm.<sup>5</sup> The duodenum should be wider than the jejunum and ileum in dogs and cats. Often you may also see stacking loops of bowel with hairpin turns. Severe focal dilation of a bowel loop indicates the presence of a potentially life-threatening condition and should provoke the veterinarian to consider surgical exploration as soon as the patient is stable enough to undergo anesthesia. If a linear foreign body is present, you may note plication of the bowel (the accordion sign).<sup>2,5</sup>

### Further diagnostics

When survey films suggest a GI foreign body but a definitive answer is not found, it will be necessary to perform a second tier of diagnostic testing, such as an upper GI series, ultrasonography or even exploratory abdominal surgery, to obtain a diagnosis.

Figure 3



Lateral cervicothoracic radiograph of a 2-year-old intact female Australian Shepherd who ingested a Kong toy foreign body in the cranial thoracic esophagus (or just past the thoracic inlet). The toy was removed using endoscopy.

**Upper GI study.** An upper GI study can aid the veterinarian in obtaining a definitive diagnosis when a GI foreign body is suspected. In nonacute cases, prepare the Pet by withholding food for 12 to 24 hours before the study.<sup>6</sup> This delay is not recommended in acute cases. Begin with a small volume of liquid contrast medium (usually 1 to 2 ml/kg of barium sulfate suspension). This smaller volume may outline a radiolucent foreign body where a normal-volume positive-contrast gastrogram could completely obscure visualization of a foreign body within the stomach.<sup>2</sup>

If a definitive diagnosis is still elusive, administer 6 to 12 ml/kg in dogs, or 12 to 16 ml/kg in cats, of contrast medium via a stomach tube or orally. The objective is to distend the stomach; you may need to use relatively more barium in small dogs and cats and less in larger dogs.<sup>6</sup> After administering contrast, obtain lateral and ventrodorsal views of the abdomen every 15 minutes for one hour and then every hour until the contrast is present in the colon.<sup>6</sup> Remember, if you suspect a GI tract perforation,

use an iodine-based contrast agent like Hypaque<sup>®</sup> instead of barium; leakage of barium into the peritoneal space can incite a severe granulomatous reaction, peritonitis or serosal adhesion.<sup>2,5,6</sup>

Gastric emptying is dependent on many factors. Low volumes of contrast delay gastric emptying and will cause incorrect interpretation of the contrast study. Delayed gastric emptying can also occur due to pain, stress, noise, anxiety and fear.<sup>5</sup> Medications can also contribute to delayed emptying, so a thorough drug history is essential. GI transit time in the dog is highly variable, but generally contrast should be out of the stomach in one to four hours. GI transit time is much faster and more consistent in the cat.<sup>5</sup> Contrast should be out of the small bowel in five hours in the dog and three hours in the cat.<sup>5</sup> If transit times are longer than this, motility is abnormal, but this does not absolutely imply the presence of a foreign body because many physiologic factors and disease processes can affect transit time.

Gastric foreign bodies will cause filling defects if the object is solid. If the object is made of an absorbent material, like a sock, the foreign body may not be evident initially because the barium will have evenly soaked into the object. Once the stomach has emptied, it can be visualized more definitively. Intestinal foreign bodies may be evident as filling defects, dilatation of bowel proximal to the object or plication.

**Ultrasonography.** Abdominal ultrasonography can be useful in the diagnostic evaluation of many disorders that cause vomiting, including GI foreign bodies. It is minimally invasive and can generate information that is not available from plain or contrast radiography, such as bowel thickness, lymph node size and abdominal organ architecture. Additionally, needle

aspirations and biopsies can be obtained with ultrasound guidance to further enhance the diagnostic process.

**Exploratory surgery.** There are occasions when earlier tests are inconclusive or unavailable and exploratory surgery is necessary. A negative exploratory surgery, just like a negative ultrasound, can produce more questions than answers, but it is better to explore the abdomen and find nothing than to ignore a problem that may result in a Pet's death. If a foreign body is not found on exploration, it should be standard procedure to obtain gastric, pyloric and intestinal biopsies to further evaluate the GI tract.

### **Client communication**

The concept of nonelective surgery—whether you are seeking to diagnose a prob-

lem or correct one you've already identified—can be difficult for owners to grasp. You know that early diagnosis and aggressive therapy are the means to a positive outcome in such cases, but it is important to ensure that clients understand this as well. Clients need to see the value of gathering a minimum database of information early in the diagnostic process so you can proceed effectively and efficiently to reach a diagnosis.

It is important to prepare clients early if there is any indication that their Pet might have a GI foreign body and may need exploratory abdominal surgery to diagnose the condition and remove the object. Clients need time to understand treatment modalities and possible outcomes, but delaying treatment of a GI foreign body could result in serious morbidity from the

development of perforations, peritonitis or sepsis.<sup>2</sup> Surgery is the most common therapeutic modality for removing a nonmobile gastrointestinal foreign body, but other options do exist.

### Medical vs. surgical therapy

Occasionally, a patient is diagnosed with a foreign body that does not require surgical removal or can be removed with a less invasive procedure. Endoscopy can be used in some cases where items are lodged in the stomach or esophagus (*Figure 3*, page 28). Linear foreign bodies (*e.g.*, thread, nylon or string) found in a cat will be attached around the base of the tongue in up to 50 percent of cases.<sup>2</sup> Cats with lingually anchored foreign bodies may be treated without surgery if they are stable, the foreign body has been ingested recently (three days or less) and there is no evidence of intestinal plication or peritonitis. The string should be detached from its anchor point on the tongue, the cat should be monitored closely and surgery should be performed if there has not been no significant improvement in 24 to 36 hours. Clients should be warned that this conservative approach may not be effective and is associated with some risk.<sup>7</sup>

Conservative therapy is not recommended for dogs diagnosed with a linear foreign body.<sup>2</sup> When an intraluminal foreign body is diagnosed in the small intestine, it is not typically recommended to use lubricants or laxatives to facilitate passage of the item unless it is causing only a partial obstruction and is small enough to pass through the ileocolic valve. Even if this is the case, you must weigh the time it may take for passage to occur and the potential damage the item could cause while being expelled through the bowel

against the risks and potential complications of immediate surgical excision.

### Expected outcomes

A positive outcome depends on timely, accurate diagnosis as well as appropriate, aggressive therapy. Thorough client communication regarding cost, prognosis and potential complications during the process is imperative. Adequate communication with the client will facilitate the clinician's ability to pursue diagnostic options so that surgical intervention can occur in a timely manner. All these factors allow you to maximize both the length and quality of life for your patients, thereby making life better for Pets and their families. 

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