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ARTICLE # 1

Gastrointestinal and esophageal foreign bodies in the dog and cat

By Jinelle Webb, DVM, DVSc, Diplomate ACVIM
Internal Medicine Dept, Mississauga-Oakville Veterinary Emergency Hospital and Referral Group
Adjunct Professor, Ontario Veterinary College

However much we try, our dogs and cats like to eat things that they should not. In some cases, even items that they are given, such as a rawhide or chew, can get stuck somewhere along the gastrointestinal tract. Dogs and cats with gastrointestinal foreign bodies most commonly present with vomiting and decreased appetite, although some may present with lethargy and abdominal pain. Esophageal foreign bodies often cause regurgitation, cervical discomfort, and in some cases, respiratory distress. If not removed rapidly, foreign bodies of the esophagus and intestine are associated with a high morbidity and mortality. Gastric foreign bodies are best removed quickly, to avoid entrance into the small intestine and possible obstruction. Diagnosis can be made via physical examination, radiography, ultrasonography, and/or exploratory laparotomy. Objects can be removed endoscopically or surgically.

Diagnosis

Commonly ingested foreign bodies in dogs include bones, rawhide, toys and balls, greenies, fish hooks, coins, towels, socks, underwear and nylons.^{1,2,3} Commonly ingested foreign bodies in cats include needles, string, toys, elastics, plastic and hair.^{1,2,3} In many cases, the owner has witnessed ingestion of the foreign material, or has returned home to find last night's garbage strewn all over the kitchen. However, sometimes the pet has ingested something out on a walk, or eaten something in the house that is not noticed as missing. Occasionally, foreign body ingestion is not witnessed by an owner in an animal with

no previous history of foreign body ingestion, and yet imaging locates a foreign body within the gastrointestinal tract. Foreign body ingestion should always be a differential diagnosis in the acutely vomiting or inappetent pet, regardless of age and history.

Common clinical signs associated with esophageal foreign bodies include retching, regurgitation of food and water, ptyalism, anorexia, restlessness and cervical pain.^{2,3} Less common presenting complaints include dyspnea, cough, and lethargy.^{2,3} Clinical signs of gastrointestinal foreign bodies may be less pronounced than with esophageal foreign bodies, and may be intermittent. Clinical signs can include vomiting, hematemesis, anorexia, lethargy, abdominal pain, or the foreign body may be an incidental finding.^{2,3} Physical examination may reveal ptyalism and cervical discomfort in pets with an esophageal foreign body. Gastrointestinal foreign bodies may have a normal abdominal palpation, or there may be a suspicious region felt or painful area noted.³ Electrolyte abnormalities are common with gastrointestinal foreign bodies, including, in order of most to least common, hypochloremia, metabolic alkalosis, hypokalemia, and hyponatremia; hyperlactatemia is also common.^{2,3,4}

Diagnostic Imaging

Radiography can be suggestive or diagnostic in many cases of esophageal and gastrointestinal foreign bodies, especially if metallic. Esophageal foreign bodies are usually visible on plain thoracic radiographs.^{2,3} An opacity is noted within the esophagus,

most commonly in the distal esophagus or at the level of the carina. The esophagus proximal to the foreign object is typically dilated with air and sometimes fluid or food. The upper esophageal sphincter is often visible on radiographs and can be mistaken for an esophageal foreign body; it should be noted that esophageal foreign bodies are uncommon in this region. In equivocal cases, a contrast agent can be administered, however there is a relatively high risk of aspiration of the contrast medium if an esophageal foreign body is present.^{2,3} It is therefore safer to perform esophagoscopy if there is a suspicion of an esophageal foreign body. Ultrasonography is rarely useful in cases of esophageal foreign bodies.

Gastric foreign bodies (other than metallic) can be challenging to definitively diagnose on both radiographs and ultrasound examination, as there is often gas and food material present in the stomach that can cause shadowing and masking of objects by overlying opacities. Barium administration can outline some gastric foreign bodies, but often does not provide a definitive diagnosis. However, both radiographs and ultrasound can strongly suggest the presence of a gastric foreign body. If food and/or gas are present, then imaging can be repeated after a period of fasting, however owners should be counselled that this could allow a potential object to enter the small intestine.

Radiography can be useful in some cases of small intestinal foreign bodies. Plain radiographs can reveal a suggestive gas pattern indicating obstruction, and bunching of intestines can be noted in linear foreign bodies

resulting in intestinal plication.³ Abdominal ultrasonography remains the most useful non-invasive method for diagnosis of small intestinal foreign bodies.^{3,5} In most cases, a shadowing object is noted within the small intestine, typically causing some degree of intestinal dilation at the site of obstruction. The small intestine proximal to the obstruction is usually dilated with fluid, and this can extend to a markedly fluid-distended stomach if the obstruction is in the upper small intestine. The small intestine distal to the obstruction should appear normal. In cases of linear foreign bodies, the small intestine can plicate or bunch around the echogenic foreign material. If a small intestinal foreign body is present for more than a short period, the associated mesentery may be hyperechoic, and associated lymph nodes may be enlarged. If free abdominal fluid is present, this may indicate perforation, and a sample should be obtained for cytology and bacterial culture.^{2,5} The presence of free abdominal air on radiographs or ultrasound indicates gastrointestinal perforation, the need for immediate surgical intervention, and a guarded prognosis.

Colonic foreign bodies are extremely rare due to the increased diameter of the colonic lumen, and the fecal material present. Pins or other sharp objects that have managed to traverse the entire small intestinal tract can become lodged within the colonic wall or rectum. Animals may display no symptoms, or have hematochezia, tenesmus, etc.² As almost all colonic foreign bodies requiring intervention are metallic, they are easily visualized on radiography, although often several views will be required to definitively determine if they are in the colon or small intestine. Abdominal ultrasound can be useful to visualize the foreign object, although fecal material can create shadowing that makes objects within

the dorsal colonic wall difficult to visualize. However, abdominal ultrasound is useful to rule out colonic perforation leading to septic peritonitis.

The administration of contrast material in cases of suspected esophageal and gastrointestinal foreign bodies is often contemplated. As mentioned earlier, this carries the risk of aspiration of contrast material due to the presence of regurgitation/vomiting. If aspirated, barium is

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much better tolerated than iodine-based contrast agents, however both can have long-term consequences if aspirated. If esophageal perforation is suspected, iodine contrast agents are safer than barium.^{2,3} Contrast administration creates shadowing artifact in the stomach and small intestine (and colon) on abdominal ultrasound, and will therefore reduce the ability of this modality to accurately diagnose a gastrointestinal foreign body. It can create complications at surgical removal of a foreign body, as well. If abdominal ultrasound is available, this imaging modality is preferred over contrast administration.^{3,5} Contrast administration also limits the ability to visualize objects endoscopically, and can damage the endoscope when suctioned. Attempting to feed animals with suspected foreign bodies should not be performed if radiography, ultrasonography, endoscopy, or surgery is likely.

Removal of Foreign Bodies

The decision on whether to remove the foreign body depends on location, clinical signs, time since ingestion of the item, and size, shape and nature of the foreign body.³ Esophageal foreign bodies require immediate removal in all cases, whereas gastrointestinal foreign bodies may pass through the entire gastrointestinal tract without issue.³ Immediate removal is indicated for large objects, objects with sharp points or sharp surfaces, irregular objects, and caustic-containing material such as batteries or pennies. A discussion about the pros and cons of removal of smaller objects should be performed in all cases, so that owners can make educated decisions about whether to pursue removal.³

Esophageal foreign bodies

All esophageal foreign bodies are an emergency requiring immediate removal.³ Delay of even a few hours can greatly increase the chance of esophageal stricture following removal. Foreign material present for an extended time in the esophagus, foreign bodies that have sharp points, and foreign bodies that expand resulting in pressure necrosis, are all at increased risk of esophageal perforation. Greenies are an example of a substance that expands and is at high risk of pressure necrosis, although recent changes to their composition have reduced this risk.⁶ Esophageal perforation, and requirement for thoracotomy to address an esophageal foreign body, both result in a much higher morbidity, mortality and complication rate.⁷ However, most esophageal foreign bodies can be removed endoscopically.² There are a variety of endoscopic grasping forceps, nets and snares that can be used to remove

foreign objects, and ideally several different types should be available. Occasionally, a urinary catheter with an expandable balloon can be endoscopically-placed beyond the foreign object, at which point the balloon can be expanded and then used to pull the foreign body rostrally out of the esophagus. Approximately 10% of esophageal foreign bodies cannot be removed orally and are pushed into the stomach; the material can either be digested and passed, or removed via gastrotomy or endoscopic removal from the stomach.^{2,3}

Difficulty ventilating a patient post removal may indicate esophageal perforation and pneumothorax. This is a medical emergency, and immediate thoracocentesis is required once the condition is diagnosed radiographically. After removal, if a perforation is suspected based on the endoscopic appearance of the esophagus, or due to the nature of the foreign object (i.e., a sharp point), then thoracic radiographs should be performed prior to recovery. Esophageal perforation requires immediate thoracotomy and surgical intervention, and the prognosis for recovery is guarded.

Gastric foreign bodies

The majority of gastric foreign bodies can be removed endoscopically. However, there are specific indications for gastrotomy. If a large number of foreign objects are present, then endoscopic removal will require a longer anesthetic time, and there could be damage to the esophagus with a large number of objects being removed individually, therefore gastrotomy is indicated. If an object has a very sharp surface (such as a razor blade) or sharp point (such as a fish hook), endoscopic removal may pose too high a risk to removal through the esophagus. In some cases, the sharp

object can be sheathed in a protective covering for endoscopic removal (baby bottle liner technique). If a very large object, or an object with a very smooth, round surface (such as a smooth rock), is present, then gastrotomy may be indicated. If an object is anchored in the stomach but extends beyond the proximal duodenum, then endoscopic removal may not be indicated. As for esophageal foreign bodies, having a large number of different endoscopic removal devices will increase the chance of removal. Most gastric foreign bodies can be removed rapidly and without complication.

Gastrotomy is a relatively simple procedure to remove foreign material. The stomach should be packed off, and stay sutures used to elevate the stomach. Once all material is removed, gloves should be changed prior to closure of the stomach. The small intestine should be thoroughly evaluated in case there are additional foreign bodies present. Complications associated with a gastrotomy performed to remove a foreign object are uncommon but can include dehiscence and septic peritonitis.[Hayes]¹

Small intestinal foreign bodies

Enterotomy is indicated when a small intestinal foreign body has been diagnosed. [Tams, Washabau]^{2,3} Endoscopic removal of small intestinal foreign bodies is rarely successful and therefore very rarely indicated. [Washabau]⁹ For a single, focal small intestinal foreign body, one enterotomy can be performed, which is typically a relatively quick procedure. However, many cases will present with multiple foreign bodies, which require several enterotomies. Linear foreign bodies often require multiple enterotomies to remove them safely. Some cases may present with longer standing foreign bodies, linear foreign bodies, or foreign bodies that result in

circumferential pressure necrosis (such as a corn cob), In these cases, there may be areas of intestine with substantial damage from pressure necrosis or excessive plication, which may require resection and anastomosis. Complications are uncommon after enterotomies and resection/anastomosis, but include dehiscence and septic peritonitis.¹ If a large amount of small intestine is removed, then small bowel syndrome can develop. As with gastrotomies, once the foreign material is removed, the entire gastrointestinal tract should be evaluated for additional foreign material.

Colonic foreign bodies

Colonoscopy remains the most effective and least invasive method of removal for colonic foreign bodies. Colonotomy is avoided if at all possible due to the potential for contamination of the abdominal cavity. However, if radiography or abdominal ultrasound evaluation suggests complete perforation of the colonic wall, or septic peritonitis, then exploratory laparotomy is indicated.

Post-procedure recovery

Esophageal foreign bodies

Immediately after removal of the esophageal foreign body, the esophagus should be evaluated for damage. Stricture formation is most likely if substantial circumferential damage is present.³ Even deep ulcers, if present in only a focal region, will likely heal without stricture formation. Percutaneous endoscopically-placed gastrotomy tubes (PEG tubes) are rarely indicated after removal of an esophageal foreign body, and there is anecdotal evidence that the passage of food through the site of the previous esophageal

foreign body may reduce the formation of a stricture. Typical medical therapy includes a histamine-2 antagonist or proton-pump inhibitor, sucralfate, and feeding gastrointestinal canned dog food as soon as possible after retrieval. If there is deep ulceration present, delaying feeding for 24 hours is recommended. Medical therapy is continued for typically for 3-7 days, depending on the degree of damage noted. Most cases can be discharged the same day or next day. In cases with a potential for stricture formation, or any cases that present with regurgitation, ptyalism, or cervical discomfort after esophageal foreign body removal, repeat endoscopy is recommended approximately 5-7 days after removal to assess for esophageal stricture formation.

Gastric and colonic foreign bodies removed endoscopically

Immediately after removal of the gastric or colonic foreign body, the stomach or colon should be evaluated for additional foreign material and damage. All air and fluid should be suctioned prior to completion. Typical medical therapy for gastric foreign bodies includes a histamine-2 antagonist or proton-pump inhibitor and sucralfate; a special diet is not usually required. If there is deep ulceration present, delaying feeding for 24 hours is often recommended. Medical therapy is continued for typically for 3-7 days, depending on the degree of damage noted. There is no specific medical therapy for colonic foreign bodies post endoscopic removal; occasionally antibiotic therapy may be pursued if deep penetration of the colonic wall is suspected. Most cases of gastric or colonic foreign body can be discharged the same day.

Gastrointestinal foreign bodies removed surgically

Post gastrotomy or enterotomy, pets should receive adequate analgesia, appropriate antibiotic therapy (cefazolin or similar), a histamine-2 antagonist or proton-pump inhibitor, sucralfate if indicated, and be fed a gastrointestinal canned dog food. Feeding should be delayed at least 12-24 hours after gastrotomy or enterotomy. Medical therapy is continued for typically for 7-10 days. Most cases can be discharged 1-2 days after surgery. Pets should be monitored closely for evidence of pain, fever, vomiting and inappetence, and should be seen immediately if any of these symptoms develop.

Esophageal foreign bodies require immediate removal in all cases, whereas gastrointestinal foreign bodies may pass through the entire gastrointestinal tract without issue.

Figure 1a ■ Lateral thoracic radiograph revealing a gastroesophageal foreign body (bone) in a Shih Tzu.

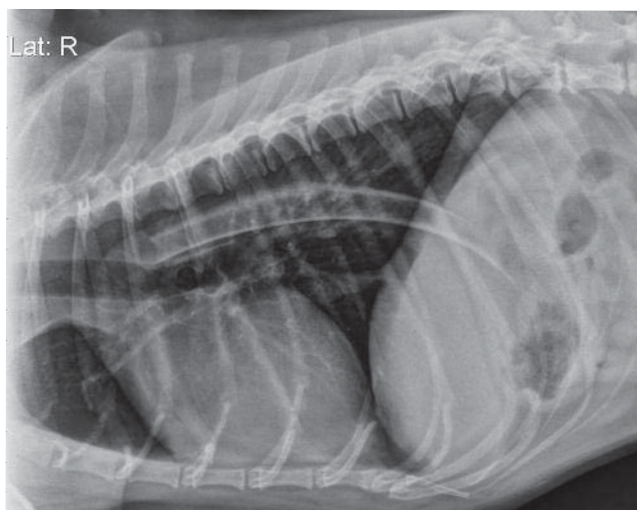


Figure 1b ■ The foreign body (Figure 1a) visualized in the esophagus endoscopically. The foreign body was removed with a snare via flexible endoscope.



Figure 2a ■ Lateral thoracic radiograph showing a large esophageal foreign body (bone).

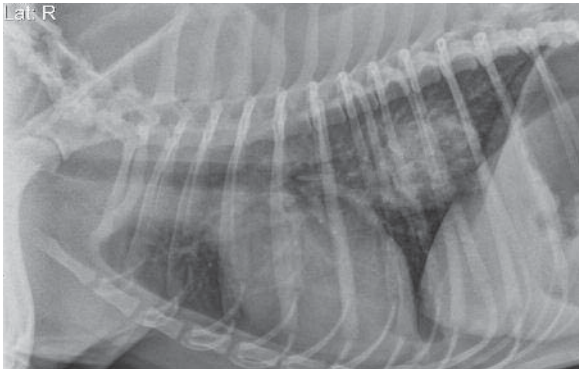


Figure 2b ■ Lateral abdominal radiograph revealing a foreign body (large hairball) in a cat, causing vomiting and anorexia.



Figure 3a ■ Ultrasound examination showing a large, shadowing foreign object in the stomach of a Doberman puppy. The dog had been seen ingesting the foam pad used to support his ear post-cropping; the object was retrieved endoscopically.

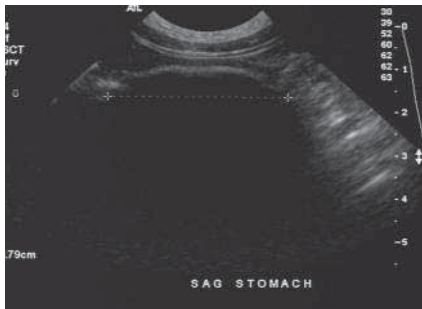


Figure 3b ■ Ultrasound examination showing a shadowing foreign body (sock) in the small intestine of a mature Standard Poodle; the small intestine distal to the foreign body (right side of image) returns abruptly to normal.

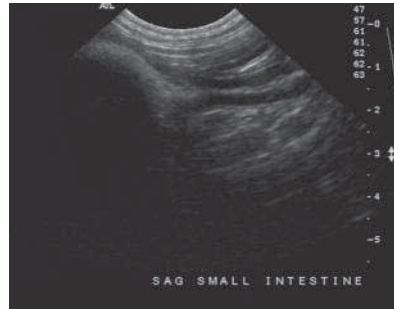


Figure 4a ■ Mild, patchy but circumferential erosion after removal of a distal esophageal foreign body.

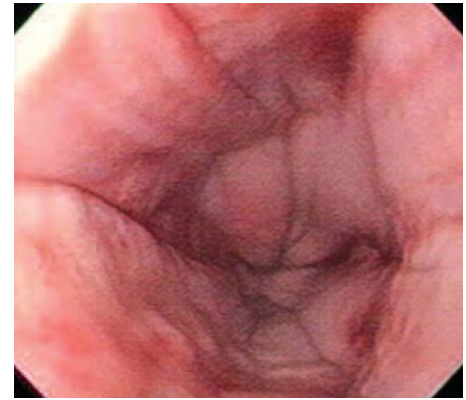
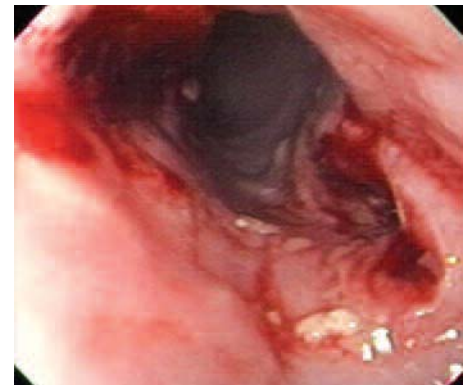


Figure 4b ■ Deep, focal ulceration after removal of a sharp, bony esophageal foreign body.



Dr. Jinelle Webb

Dr. Jinelle Webb completed her Small Animal Internal Medicine Residency and DVSc in 2005 at the Ontario Veterinary College, and obtained board certification with the American College of Veterinary Internal Medicine that year. In 2006, Dr. Webb started the Internal Medicine Service at the Mississauga-Oakville Veterinary Emergency Hospital. Dr. Webb has also spearheaded the rotating internship and Internal Medicine residency programs at this practice. She is an Adjunct Professor at the OVC.

Dr. Webb's main clinical research interests include: investigating the use of laboratory testing and non-invasive imaging modalities in healthy dogs and cats, developing novel approaches to internal medicine procedures and investigating ways to reduce the invasiveness of procedures. She is a published author and speaker.



Full references for this publication are available at www.oavt.org.