InBetweentheBlinks/shutterstock.com

INTERNAL MEDICINE

# Esophageal Foreign Bodies

***Audrey K. Cook**, BVMS, MRCVS, MSc Vet Ed, DACVIM-SAIM, DECVIM-CA, DABVP (Feline)*
*Texas A&M University College of Veterinary Medicine & Biomedical Sciences*

An esophageal foreign body (EFB) is any ingested item that fails to pass into the stomach after being swallowed. The most frequently reported EFBs in companion animals are bones, but large pieces of food, hairballs (trichobezoars), treats (dental chews, rawhide), and sharp objects (needles, fishhooks) can also become lodged.[1-3] Although EFBs are reported for both dogs and cats, they are relatively rare in cats, who are much more discriminatory eaters. This article reviews the clinical signs, diagnosis, and management of EFBs in companion animals.

## PRESENTATION AND CLINICAL SIGNS

Sometimes clients are immediately aware that their animal has eaten something inappropriate, such as a fishhook, and seek veterinary care promptly. More often, however, patients are presented hours to days after EFB ingestion, when they show evidence of distress or compromise. Clinical signs associated with an EFB include pain with a change in posture or head carriage, drooling (may or may not be bloody), regurgitation, repeated attempts to swallow, and anorexia.[1,2] Patients with secondary aspiration pneumonia may cough and/or have a more rapid and exaggerated respiratory rate. Fever and overt malaise suggest either pneumonia or esophageal perforation with septic pleuritis.

## DIAGNOSIS

The most practical way to identity an EFB is by radiography. Most EFBs lodge in the caudal third of the esophagus, but the entire cervical esophagus should be included in all imaging studies to avoid missing a proximal lesion (**FIGURE 1**).[1,3,4] Radiopaque EFBs are usually easily identified, although the trabecular nature of poultry bones can be somewhat misleading (**FIGURE 2**). Radiolucent objects are less readily identified but may be outlined by air in the esophagus or suggested by accumulated food material. Although a small amount of radiologic contrast material may be given to confirm an EFB, barium-based materials can complicate endoscopic retrieval and are contraindicated for patients with esophageal perforation.

**RESCUE MISSION**
There are several ways to retrieve an esophageal foreign body, including blind removal, endoscopic retrieval, fluoroscopic retrieval, and surgical retrieval.

Thoracic films should be reviewed carefully for evidence of air in the mediastinum, pleural effusion, or aspiration pneumonia (**FIGURE 3**). Free air or pleural fluid indicates perforation and associated mediastinitis, pleuritis, or pyothorax. In a recent study, esophageal perforation was diagnosed radiographically at the time of presentation for 4 (3.2%) of 125 dogs with an EFB; perforation was subsequently identified endoscopically for an additional 10 (8%).[4] This finding suggests that the diagnostic sensitivity of plain radiography for perforation may be limited. For people with an EFB, computed tomography is routinely used to assess esophageal integrity and may be similarly advantageous in dogs and cats;[5] however, cost and limited availability preclude its widespread use in veterinary patients.

Additional initial diagnostics should include a complete blood count to look for evidence of hemoconcentration or sepsis, along with a serum biochemistry panel with electrolytes.

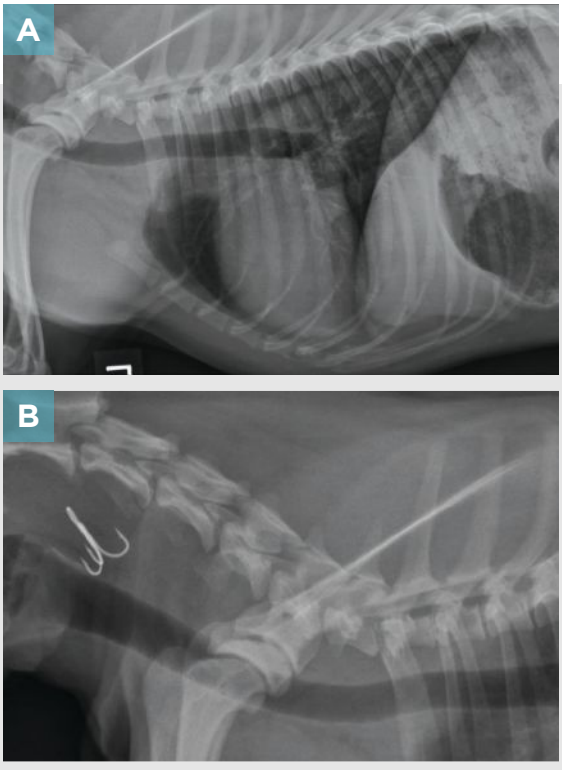


**FIGURE 1.** Radiographs of a 3-year-old spayed female terrier mix suspected of having swallowed a fishhook. **(A)** Left lateral thoracic view. An EFB is not identified on this view. **(B)** Right lateral cervical view. A 3-pronged fishhook is readily apparent and appears to be lodged close to the upper esophageal sphincter.

## MANAGEMENT

Management of an EFB has several options (**TABLE 1**). Decisions regarding the most appropriate approach depend on the condition of the patient, the nature of the EFB, time since ingestion (if known), client financial resources, and access to specialty facilities/equipment. The author believes that the best chance for a positive outcome is provided by prompt endoscopic removal (with or without fluoroscopic visualization) but recognizes that this approach is not always feasible. Recently ingested food items, bones, and treats may be managed with relatively simple approaches, whereas a

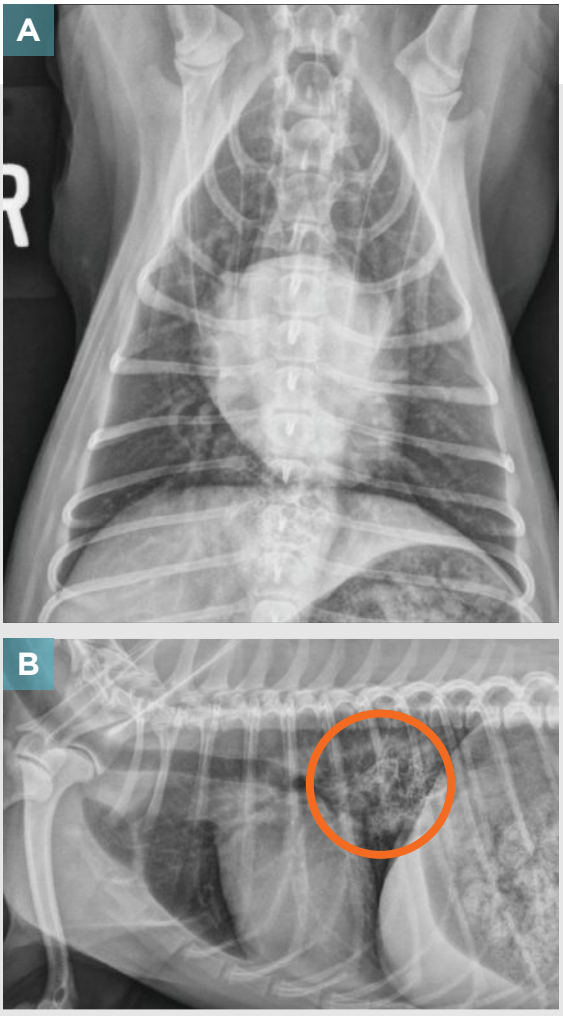


**FIGURE 2.** Radiographs of a 7-year-old castrated male Maltese terrier with a 2-day history of exaggerated swallowing efforts and anorexia. **(A)** Ventrodorsal thoracic view, essentially unremarkable. **(B)** Right lateral thoracic view, showing a distinct trabecular pattern in the caudal thorax, overlying part of the diaphragm. This finding may be mistaken for pulmonary pathology but is not evident on the orthogonal image. This dog had a flesh-covered chicken bone **(orange circle)** lodged orad to the lower esophageal sphincter.

Courtesy Texas A&M Imaging/Radiology Service (4). Opposite: courtesy Texas A&M Imaging/Radiology Service (2).

fishhook usually requires endoscopic or surgical removal. Items (particularly bone or other rigid material) that have been in the esophagus for prolonged periods (>24 hours) may cause mucosal necrosis;[1-4] these patients are probably best served by an endoscopic approach. Emergent referral to a specialist facility is indicated for any patient with evidence of free gas, mediastinitis, or pyothorax (**FIGURE 3**).

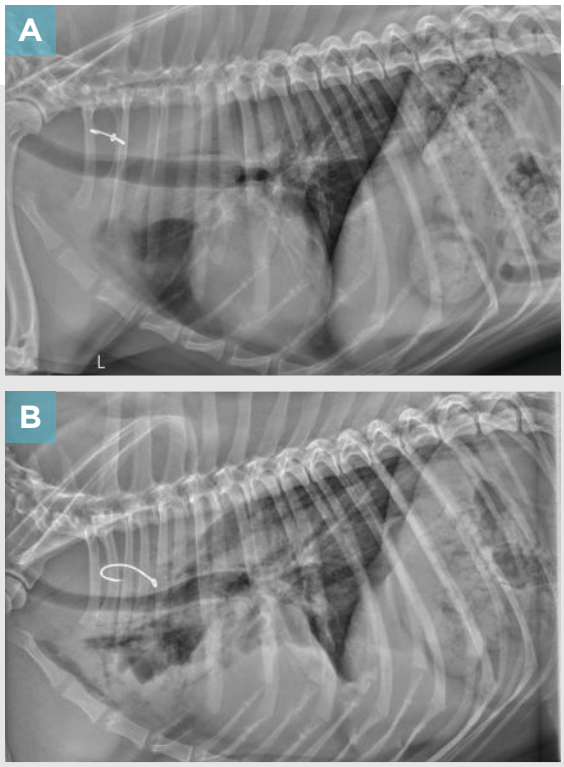


**FIGURE 3.** Radiographs of a 9-year-old spayed female boxer dog with a fishhook lodged in the cranial thoracic esophagus. **(A)** Left lateral thoracic view, showing mild fluid dilation of the thoracic esophagus. Linear gas opacities dorsal to the trachea may represent gas in the esophagus or mediastinum. **(B)** Right lateral thoracic view, taken approximately 24 hours later. The fishhook remains in the cranial thoracic esophagus. The cranial thoracic esophagus is now narrowed, and there is gas and fluid within the mediastinum and the cranial pleural space. An alveolar pattern can be seen in the ventral aspect of the cranial and caudal subsegments of the left cranial lung lobe, depicting probable pneumonia.

## Medical Stabilization

Immediate supportive care should include appropriate fluid therapy to address dehydration and electrolyte imbalances, along with provision of analgesia (preferably opioid-based). Concurrent administration of maropitant is recommended to reduce the likelihood of emesis secondary to opioid administration. An injectable proton-pump inhibitor (e.g., pantoprazole at 0.5 to 1.0 mg/kg IV given over 15 minutes) should be administered to mitigate additional esophageal damage secondary to gastric reflux. Parenteral antibiotics are indicated for patients with aspiration pneumonia and/or signs of pleural effusion or pneumomediastinum.

## EFB Retrieval

Patients require general anesthesia before attempts are made to remove or dislodge an EFB. The patient should be appropriately stabilized prior to induction unless the EFB is compressing the trachea and the patient's ability to ventilate is compromised.

### Blind Removal with Forceps

Specialized devices are available to assist with EFB removal; these are long, rigid instruments with various tips and are designed to grab (with or without locking) solid objects. In small patients or those with very proximal EFBs, standard surgical instruments such as Carmalt forceps may be adequate.

Blind removal may be appropriate for food items, treats, fabric, hairballs, and recently (<24 hours) ingested bones but may be an unsuitable approach for fishhooks or longer-standing bone EFBs because esophageal integrity may be compromised.

**TABLE 1 Management Options for Esophageal Foreign Bodies**

| PROCEDURE | POSSIBLY WITH RADIOGRAPHIC ASSISTANCE | POSSIBLY WITH FLUOROSCOPIC ASSISTANCE | POSSIBLY WITH GASTROTOMY |
|---|---|---|---|
| Blind removal with forceps | Yes | | |
| Blind advancement into stomach | Yes | | Yes |
| Endoscopic retrieval | | Yes | |
| Surgical removal (esophagotomy) | | Yes | |

The preferred patient position is generally right lateral recumbency, which facilitates easy access to the upper esophageal sphincter and effective alignment of the mouth and esophagus. It can be helpful to place a piece of tape on the retrieval device to represent the calculated distance (based on radiography) of the EFB from the patient's mandibular canine teeth. If possible, digital radiography should be used during the procedure to confirm proximity to the EFB and effective dislodgement. Essentially, the instrument is lubricated and then gently introduced until it touches the EFB. The device is then slowly opened, gently advanced, and cautiously closed. Moderate traction is then used to withdraw the device and the EFB. Resistance at the start of withdrawal suggests entrapment of the esophageal mucosa, for which the device should be opened and the retrieval attempt repeated. If resistance is encountered after initial free movement, the EFB may be caught at the upper esophageal sphincter, for which gentle rotation with continued traction is often sufficient to overcome this effect. Intermittent radiography may be very helpful during this process.

If safely grasping the EFB is difficult, moving it toward the oral cavity may be helped by passing a tube with an inflatable cuff (e.g., a Foley catheter or endotracheal tube, if the latter can pass beside the foreign body) into the distal esophagus. The cuff is positioned beyond the EFB and then inflated, followed by a gentle antegrade pull to bring the EFB into the oral cavity or a more accessible location within the esophagus.

## Blind Advancement into the Stomach

Advancement into the stomach is a good option for large or circular EFBs, such as food or recently ingested bones that are located in the distal third of the esophagus. It is unlikely to be a successful approach for slim or flat EFBs and/or embedded items such as fishhooks.

The patient should be placed in right lateral recumbency. A suitably sized semirigid tube (e.g., stomach tube or endotracheal tube) is lubricated, inserted into the esophagus, and advanced slowly. As a general rule, the tube should be 1 to 3 cm in diameter, depending on patient size. Digital radiography may be used to determine proximity to the EFB and its movement. The goal is to drive the EFB through the lower esophageal sphincter and into the stomach; care should be taken to not simply bypass or further embed the EFB and exacerbate esophageal mucosal injury. Food material and most bones can be left to digest when successfully moved into the stomach; objects that might become lodged in the pylorus or small intestine should be removed via gastrotomy.

## Endoscopic Retrieval

Endoscopy is the preferred method for retrieval of most EFBs, particularly sharp or embedded items, because they can be effectively manipulated and disengaged when endoscopically visualized. The condition of the mucosa can also be evaluated during endoscopy, which is useful for long-standing bone EFBs for which esophageal necrosis is a concern. Scopes that can be used are hollow rigid endoscopes (e.g., proctoscopes) and flexible endoscopes.

**Rigid endoscopes** enable the operator to use large retrieval devices and can protect the esophagus from further damage during removal of sharp EFBs, such as needles and fishhooks. However, visualization is often suboptimal and the operator has to kneel in front of the patient if videoendoscopy is not available. Also, more distal objects may not be reachable with a rigid endoscope.

**Flexible endoscopes** permit detailed evaluation of the esophagus and more careful manipulation of the EFB. The ability to make careful, directed movement is crucial for fishhook retrieval because hooks may be embedded in more than one spot and need to be removed with a clear understanding of their points of attachment.

Various endoscopic retrieval devices are available, including baskets, loops, and grabbers. Practitioners should invest in a number of different devices and be prepared to try various options during any one procedure. However, instrument type, size, and strength are limited; it can therefore be challenging to grasp or hold on to a large or smooth object. Advancement into the stomach (blindly or with radiographic or fluoroscopic visualization) may be necessary under these circumstances. Depending on the nature of the EFB, some clinicians will insert the flexible endoscope through a semirigid tube (e.g., an equine endotracheal tube) to protect the proximal esophagus from sharp EFBs or the re-engagement of a fishhook barb. This approach also enables concurrent use of a large rigid retrieval device, which is simply inserted adjacent to the flexible scope and used under direct visualization.

Cautious air insufflation is a key component of both rigid and flexible esophagoscopy. In patients with a full-thickness esophageal perforation or substantial necrosis, aggressive insufflation carries the risk for tension pneumomediastinum with or without pneumothorax.[1]

Reported success rates for endoscopic removal range from 73% to 92% and seem to be influenced by the nature of the EFB and the duration of clinical signs.[1-4,6]

### Fluoroscopic Retrieval

Use of fluoroscopy follows the principles outlined for blind removal and blind advancement but includes the advantage of real-time image guidance. In a report of 61 admissions to one teaching hospital, this method was successful for 51 (83%) retrievals, including 10 fishhooks.[7] This approach is not widely used, although the author routinely uses concurrent fluoroscopy when performing complex endoscopic or surgical EFB retrieval.

### Surgical Retrieval

Cervical or transthoracic esophagotomy is indicated when less invasive methods are unsuccessful or when radiographic or endoscopic evidence indicates substantial esophageal compromise and leakage. In experienced hands, reported outcomes are encouraging; 77% to 93% of dogs undergoing surgical EFB retrieval survive to discharge.[1,8]

## PATIENT MANAGEMENT AFTER EFB REMOVAL

If there are reasons to suspect perforation after EFB removal—such as excessive hemorrhage, a noticeably increased respiratory rate, or changes in thoracic compliance (qualitatively assessed by difficulty effectively ventilating the patient)—thoracic radiographs should be taken immediately. Small amounts of free air do not need to be addressed, but more substantial amounts may need to be evacuated. Experimental studies and clinical reports indicate that small transmural esophageal defects (<12 mm) can seal without intervention but that surgical intervention should be considered if a large esophageal defect is suspected.[4,9]

At Texas A&M, esophageal feeding tubes are routinely placed in patients with endoscopic evidence of esophagitis, positioned with the distal tip at least 10 cm beyond the affected area. The primary intent is to provide nutritional support in the event of prolonged hyporexia; however, it is the author's opinion that the presence of the esophageal tube may reduce the likelihood of subsequent stricture formation. In brief, a soft-tipped guidewire is directed across the lesion endoscopically, the endoscope is removed, and the esophageal feeding tube is then inserted orally over the wire into the esophagus. The guidewire is then removed, and an Esophageal Feeding Tube Passer (Mila International Inc., milainternational.com) is used to complete retrograde placement. This approach prevents additional iatrogenic trauma to the compromised esophagus. The animal is allowed to eat voluntarily, and the tube is removed after 2 to 3 weeks. Other authors have described placing gastric feeding tubes (either percutaneously or surgically) in dogs with substantial esophagitis.[10]

All patients should receive a proton-pump inhibitor (initially IV [e.g., pantoprazole at 0.5 to 1.0 mg/kg q24h], then PO [e.g., omeprazole at 0.7 mg/kg q12h])

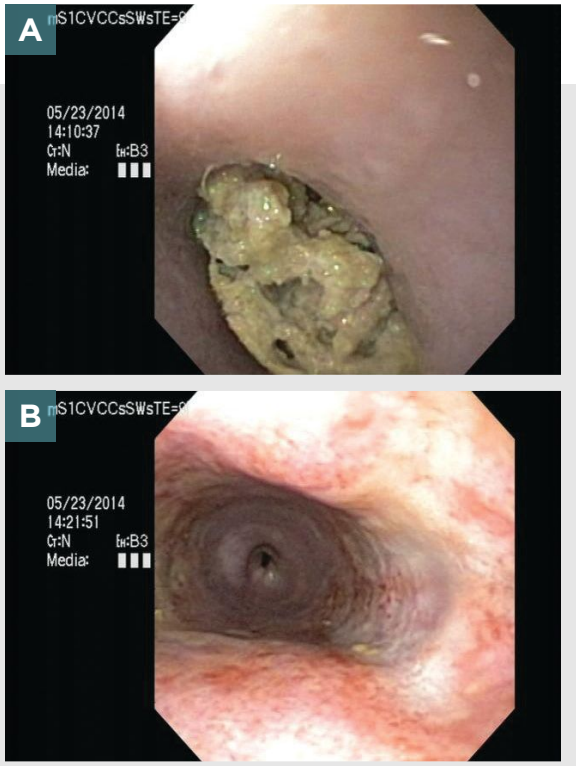


**FIGURE 4.** Endoscopic images of distal esophagus of a 5-year-old castrated male miniature poodle with a large piece of jerky treat lodged in the distal esophagus for at least 3 days. **(A)** Image before EFB retrieval. **(B)** Image after EFB retrieval. Note the erythema and areas of superficial erosion across the mucosal surface of the esophagus.

Reported success rates for endoscopic removal range from 73% to 92% and seem to be influenced by the nature of the EFB and the duration of clinical signs.[1-4,6]

for 5 to 7 days. Sucralfate slurry (0.25 to 1 g/dog, dissolved in 1 to 4 mL water) may be given orally q8h to patients with evidence of esophagitis, although its effect is likely to be modest in the absence of an acid environment. Postprocedural discomfort should be addressed as needed.

## COMPLICATIONS

Immediate complications related to the EFB (and/or efforts to remove it) include esophageal perforation and aspiration pneumonia.[1,2,5] More commonly, signs of esophagitis may be noted and include ptyalism, gagging, retching, and reluctance to eat.[10] Postremoval esophagitis is more likely in dogs with long-standing EFBs (**FIGURE 4**). Patients should receive acid-reducing agents (e.g., proton-pump inhibitors) and sucralfate slurry. Metoclopramide (0.2 to 0.5 mg/kg PO, SC, IM, or IV; 1 to 2 mg/kg q24h IV at a constant rate infusion) may tighten the lower esophageal sphincter and reduce gastric reflux in dogs with distal esophageal inflammation. A feeding tube should be considered for any patient with prolonged hyporexia; the type of tube and its placement method should be carefully considered to avoid exacerbation of esophagitis.

Esophageal stricture secondary to an EFB causes substantial patient compromise and has been reported for 1% to 24% of patients.[1-3,6,10] Long-standing EFBs with extensive or circumferential mucosal contact are most often associated with subsequent stricture formation. Signs usually begin within 2 weeks of EFB removal and include the regurgitation of undigested food, with or without fluid, soon after eating and exaggerated swallowing efforts. Prompt intervention is necessary because strictures can progress quickly and management becomes more challenging as the cicatrix contracts. To confirm and localize the lesion(s), esophagoscopy or a contrast esophogram (preferably performed with fluoroscopy) is needed. Clinicians and clients should be aware of the risks associated with aspiration of contrast material. The prognosis for esophageal stricture is variable, but referral for ballooning is generally warranted. There are numerous ways to approach this procedure; the author routinely measures the esophageal diameter and then balloon the stricture(s) under simultaneous endoscopic and fluoroscopic guidance. After successful effacement of the lesion(s), an esophageal feeding tube with a balloon dilator is placed, which lets the client dilate the lesion at home for several weeks and is thought to reduce the risk for stricture recurrence.[11]

## SUMMARY

Although there are various ways to address an EFB, in most circumstances, endoscopic removal seems to be the most appropriate approach. When making treatment recommendations, practitioners should consider the nature and duration of the EFB, along with the client's financial resources. Complications are more likely in small dogs and those with bone or dental chew EFBs.[1-3,6] Small esophageal defects may heal without surgical intervention, but patients with radiographic evidence of mediastinitis or pleural involvement might require aggressive management. The most common major sequela is esophageal stricture; this possibility should be investigated promptly in a patient with regurgitation or abnormal swallowing behavior 1 to 2 weeks after EFB removal. The overall prognosis for dogs with an EFB is fairly good; reported survival rates are 75% to 95%. TVP

To see the references for this article, please visit **todaysveterinarypractice.com**.

**Audrey K. Cook**

Dr. Cook is a graduate of the University of Edinburgh. She completed an internship at North Carolina State University and a residency in internal medicine at the University of California, Davis. She is a Diplomate of the American and European Colleges of Veterinary Internal Medicine and has additional board certification in Feline Practice. After a decade in private referral practice, Dr. Cook joined the faculty at Texas A&M College of Veterinary Medicine & Biomedical Sciences, where she is professor and chief of the Internal Medicine Service. Her clinical interests include canine and feline endocrinology and gastroenterology.