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ESOPHAGEAL FOREIGN BODIES AND OBSTRUCTION IN THE EMERGENCY DEPARTMENT SETTING: AN EVIDENCE-BASED REVIEW

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☐ **Abstract—Background: Patients with esophageal foreign bodies or food bolus impaction may present to the emergency department with symptoms ranging from mild discomfort to severe distress. There is a dearth of emergency medicine–focused literature concerning these conditions. Objective of the Review: This narrative review provides evidence-based recommendations for the assessment and management of patients with esophageal foreign bodies and food bolus impactions. Discussion: Esophageal foreign bodies and food bolus impaction are common but typically pass spontaneously; however, complete obstruction can lead to inability to tolerate secretions, airway compromise, and death. Pediatric patients are the most common population affected, while in adults, edentulous patients are at greatest risk. Foreign body obstruction and food bolus impaction typically occur at sites of narrowing due to underlying esophageal pathology. Diagnosis is based on history and examination, with most patients presenting with choking/gagging, vomiting, and dysphagia/odynophagia. The preferred test is a plain chest radiograph, although this is not required if the clinician suspects non-bony food bolus with no suspicion of perforation. Computed tomography is recommended if radiograph is limited or there are concerns for perforation. Management requires initial assessment of the patient's airway. Medications evaluated include effervescent agents, glucagon, calcium channel blockers, benzodiazepines, nitrates, and others, but their efficacy is poor. Before administration, shared decision making with the patient is recommended. Endoscopy is the intervention of choice, and medications should not delay endoscopy. Early endoscopy for complete obstruction is associated with improved outcomes. Conclusions: This review provides evidence-based recommendations concerning these conditions, focusing on evaluation and management. Published by Elsevier Inc.**

☐ **Keywords—complete obstruction; endoscopy; esophageal foreign body; food bolus impaction**

INTRODUCTION

Esophageal foreign bodies resulting from ingestion or food bolus impaction are common and often pass spontaneously. However, esophageal foreign bodies with occlusion result in approximately 1500 deaths in the United States annually (1–4). The incidence of food bolus impaction has been reported to be 13 per 100,000 population (5). Pediatric patients are more likely to ingest foreign bodies, occurring most commonly between the ages of 6 months and 6 years (3). Up to 75% of cases involve children aged < 4 years (6–12). Adults experience obstruction more commonly due to food bolus, though intentional ingestion can occur in

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those with intellectual disability, psychiatric illness, incarceration, and body packing (13–19). Underlying esophageal pathology leading to obstruction and impaction is more common in adults (3–5,15,17). Among adults, the most common patient experiencing impaction is an edentulous patient attempting to swallow poorly masticated food (3,20–23). Among edentulous patients, dentures are a common foreign body (20). For adults, meat is the most frequently impacted food, followed by fish and vegetables (22,23). Coins are the most common object ingested overall, accounting for > 70% of foreign bodies in pediatric patients (2,6,24).

Foreign body obstruction and food bolus impaction most often occur at sites of narrowing or angulation due to underlying esophageal pathology that disrupts normal passage (e.g., stricture, hiatus hernia, esophageal web, and Schatzki ring) (3,17–20,23–32). Among those without a structural or accidental etiology, there may be a seasonal variation, with one study finding higher rates in summer and fall, which may be due to a coexisting atopic diathesis (33). A higher incidence of impaction is also present during cultural holidays and national athletic events due to dietary indiscretions, such as excess alcohol ingestion or overeating (34). Etiologies associated with esophageal impaction are demonstrated in Table 1. Among these, eosinophilic esophagitis is increasingly recognized as a potential cause (35–37). Eosinophilic esophagitis has been identified in 27–53% of patients with food bolus impaction, especially in patients aged < 50 years (37–41). Eosinophilic esophagitis has a male predominance and is characterized by T-cell activation and immunoglobulin E sensitization with dense esophageal eosinophilia (37–42). This leads to chronic esophageal inflammation and remodeling (35,37). Older patients more commonly demonstrate other esophageal pathology, including malignancy or mass, strictures, esophageal motility disorder, and others (3,41).

Most ingested foreign bodies pass through the esophagus and gastrointestinal system without harm, although 10–20% will require intervention (1,3,39,42–44). Importantly, ingestion of sharp objects can result in perforation, which may occur in up to 2% of cases (15,16,31,39,42–50). Intentional foreign body ingestion is associated with greater rate of endoscopic intervention, ranging from 63% to 76% of cases (3,15,16,49). Surgical intervention is required in 10–16% of intentional ingestion cases (3,15,16,49).

METHODS

Authors searched PubMed and Google Scholar for articles using the keywords *esophagus*, *impaction*, *obstruction*, *foreign body*, and *emergency* for production of this narrative review. Authors included case reports and series, retrospective and prospective studies, systematic reviews and meta-analyses, clinical guidelines, and other narrative reviews. The literature search was restricted to studies published in English. Initial literature search revealed more than 240 articles. Authors reviewed all relevant articles and decided which studies to include for the review by consensus, with focus on emergency medicine–relevant articles, including guidelines. Articles detailing specific gastrointestinal procedures, such as endoscopic removal techniques, were not included. A total of 157 resources were selected for inclusion in this review. As this is a narrative review, authors did not pool individual study data.

DISCUSSION

Anatomy and Pathophysiology

The esophagus is a fibromuscular tube that begins around the sixth cervical vertebra behind the cricoid cartilage and passes downward in the mediastinum. The lower

Table 1. Underlying Etiologies of Esophageal Impaction

Benign Etiology	Malignant Etiology	Extrinsic Compression	Esophageal Motility Disorder
Schatzki ring Esophageal web Poorly masticated food Peptic stricture Post-surgical stricture Eosinophilic esophagitis Neurologic dysmotility/disorder Collagen vascular disease Submucosal mass Paraesophageal hernia	Esophageal cancer Gastric cancer	Mediastinal mass/tumor Aortic abnormality	Primary: ◦ Achalasia ◦ Diffuse esophageal spasm ◦ Gastroesophageal reflux Secondary: ◦ Pseudoachalasia ◦ Chagas disease ◦ Scleroderma ◦ Parkinson's disease ◦ Infiltrative disorder Manometric variant: ◦ Nutcracker esophagus ◦ Hypertensive esophageal sphincter ◦ Ineffective esophageal motility

esophagus curves around the thoracic aorta behind the heart and, after the tracheal bifurcation, passes posterior to the right pulmonary artery, left atrium, and left main bronchus. The esophagus then passes through the diaphragm around the tenth thoracic vertebra and ends in the stomach. The final length approaches 25 cm. Due to its path, the esophagus has four points where obstruction or impaction most commonly occur: 1) behind the cricoid cartilage at the cricopharyngeus muscle, 2) where it crosses in front of the aortic arch, 3) at the level of the left main bronchus, and 4) at the esophageal hiatus as it passes through the diaphragm (Figure 1) (2,3,5,6). Approximately 75% of ingested foreign bodies occur at the level of the cricopharyngeus muscle (2,3,23,27,51).

History and Physical Examination

Diagnosis is based on history and examination and does not require radiographic confirmation in the majority of cases. Older pediatric patients and unimpaired adults can often provide an accurate history and localize the site of discomfort. However, the patient's specific site of discomfort does not necessarily correlate with the true site of impaction (52). Symptoms may not present immediately with impaction and may take time to develop, in association with complication from the foreign object (48–52). Adults with esophageal impaction may present with retrosternal pain (78%), odynophagia (43.4%), dysphagia (48%), nausea, or vomiting (32). Pediatric patients with foreign body ingestion often present with choking/gagging (49%), vomiting (47%), and dysphagia/odynophagia (42%) (52). However, up to 76% of pediatric patients can have a normal examination (52). Patients with severe obstruction can present with hypersalivation, aspiration, and coughing, as well as the inability to tolerate secretions (3,53). Younger pediatric patients and those with mental impairment are often unable to provide an accurate history, so it is important to keep esophageal foreign body on the list of differential diagnoses in patients presenting with these symptoms (6,14,54).

Vital signs, such as hypoxemia, tachycardia, and hypertension, may occur with episodes of prolonged, complete esophageal obstruction (3,53–57). Examination may reveal neck swelling, tenderness, erythema, or crepitus with oropharyngeal or proximal esophageal perforation (3,53–67). More distal esophageal rupture can result in peritonitis and systemic illness (3,53–67).

Evaluation and Diagnosis

While many diagnoses can be made by history and physical examination alone, radiographic evaluation can be valuable in certain cases, especially in the setting of metallic foreign body ingestion or for the evaluation for pneumoperitoneum or pneumomediastinum. The preferred initial test is a plain radiograph of the chest with postero-anterior and lateral views, though this is not required if the clinician suspects non-bony food bolus and there are no signs of perforation (Figure 2) (3,24,53,63–76). Evaluation of the location, size, number, and shape of the foreign bodies is important for management (3,24,53,68,69,72). Coins on radiograph are most commonly located at the

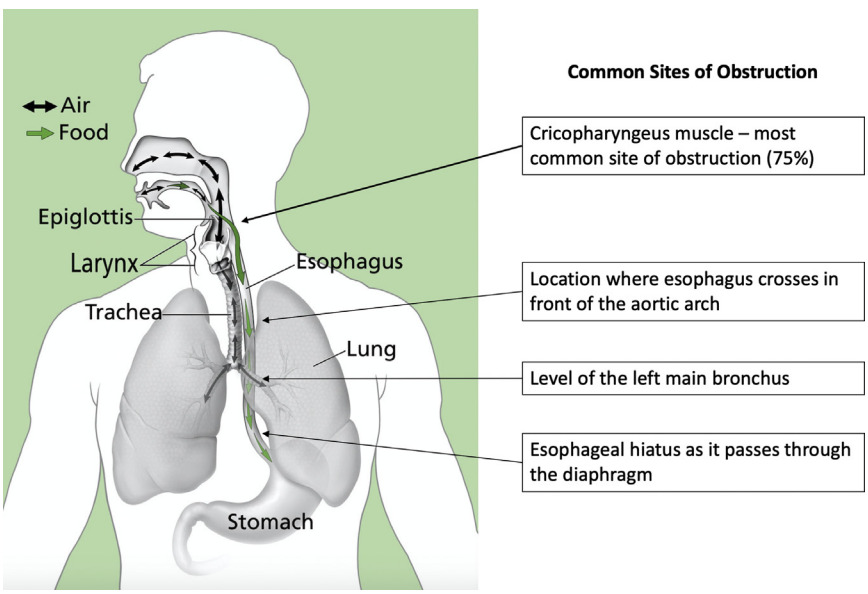

Figure 1. Most common sites of esophageal obstruction/impaction.

cricopharyngeal level (2,6,24,68,69,72). An object that looks like a coin must be differentiated from a button battery, which demonstrates a "halo" appearance on frontal radiograph and "step-off" appearance on lateral radiograph (2,3,6,24,68,69,72). Fish or chicken bones, other food material, glass, wood, plastic, and thin metal objects are not typically seen on radiograph due to poor radiopacity (2). If clinical suspicion remains despite negative radiographs, further imaging is warranted (2,3). One study evaluating patients with swallowed fish bones found a sensitivity of only 32% with x-ray study (73). Another study evaluating foreign bodies in pediatric patients found 59% of patients with confirmed ingestion had a normal chest x-ray study (46). Regarding foreign bodies in adult patients, x-ray can be normal in up to 47% of all cases and up to 87% of cases with a food bolus (2). Importantly, x-ray has decreased accuracy for assessing the presence of a perforation from a foreign body because air passage into the peritoneal cavity may be blocked by fibrin and omental coverage of the perforation site (68,69,72,74). False positives may also occur due to the laryngeal calcifications along the styloid process or calcification of the stylohyoid ligament (75). Therefore, if the initial x-ray study is negative, or if esophageal perforation is suspected, further imaging with computed tomography (CT) is recommended (2,3,76,77).

Contrasted studies with barium are not recommended due to the risk of aspiration and because barium may obscure visualization on endoscopy (3,63–66,76–78). CT displays better sensitivity than plain radiographs, particularly when 3-dimensional reconstruction with i.v. contrast is performed, with an overall sensitivity ranging from 90% to 100% and specificity of 93.7% to 100% for detection of a foreign body (3,53,56,72,74–81). CT can also evaluate foreign body shape, size, location, and associated complications (68,70,72,74,76,78–88). While most objects are visible on CT, some may be more challenging to identify. For example, wood is best identified early after ingestion because the tiny air bubbles and oil help to visualize the structure (2). However, over time, the wood absorbs water, which results in an appearance that can mimic that of soft tissue (2).

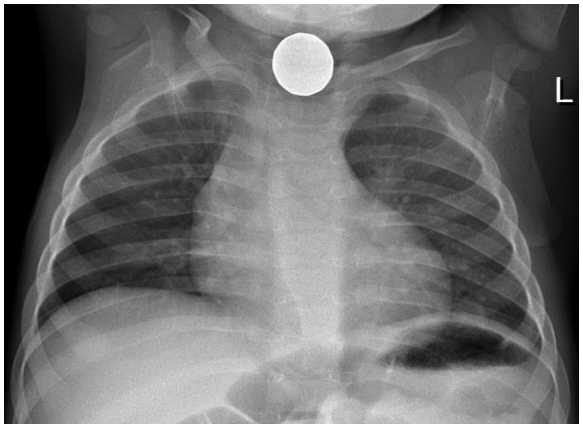

Figure 2. Chest radiograph demonstrating esophageal coin. From https://commons.wikimedia.org/wiki/File:Foreign_body_aspiration.jpg.

CT can also evaluate for foreign body–related complications, such as perforation, mediastinitis, abscess formation, and fistula (2,3,76,77). When obtaining a CT to evaluate for complications such as perforation, i.v. contrast is generally recommended because it provides greater ability to detect complications (2,81,83–88). However, CT, with or without contrast (including i.v. and oral water-soluble contrast, if used) does not display 100% sensitivity for perforation (81,83–88). Signs of esophageal perforation on CT include extraluminal air or fluid surrounding the esophagus or within the mediastinum, extravasation of oral contrast material, esophageal thickening, and pleural effusions (most commonly unilateral). CT results should be considered in the context of the patient's presentation, as sensitivity ranges from 77% to > 90% for these findings (81,83–88). Sensitivity increases when CT is combined with esophagography with water-soluble contrast material, which has greater sensitivity for small perforations (83,85,86).

In pediatric patients, a handheld metal detector (HHMD) has been used successfully to localize and track metallic objects (89–91). One systematic review found a sensitivity and accuracy > 99% for coin detection and localization compared with chest radiograph, though sensitivity approaches 70% for other metallic foreign bodies. A foreign body detected with HHMD proximal to the gastroesophageal junction, or costal margin, is likely within the esophagus and should be confirmed with radiograph (89–91). A foreign body detected distal to that point or in the right upper quadrant with standing is likely in the stomach. However, suspicion of an ingested battery mandates radiography.

Ultrasound may be able to detect impaction by evaluating for the presence of persistent air–fluid levels after swallowing, esophageal dilation, or directly visualize the foreign body, though further studies are required prior to routine use (92–94). While more invasive, endoscopy provides another avenue for concurrent diagnosis and intervention; this modality is typically considered the definitive modality for assessment and management (3,53–56).

Management

Airway. Assessment of the patient's airway is the first step in the initial evaluation. Patients with respiratory distress or failure require immediate intervention with endotracheal intubation. A patient unable to manage secretions

is at high risk for aspiration and also requires intervention (3,53). Evaluation in the patient with impacted food bolus who is stable and nontoxic is different than the patient with a non-food foreign body. In the patient with impacted food bolus and otherwise stable hemodynamic and respiratory status, physical actions with medications can be attempted, consisting of repeated neck extension movements with swallowing, which may be combined with effervescent agents or medications, discussed in the following section. However, there is no strong literature support for these measures.

Medications for impacted food bolus. While various agents and medications have been advocated for food bolus esophageal impaction, few have demonstrated significant efficacy. Effervescent agents (i.e., substances resulting in gas formation) have also been evaluated for use in esophageal impaction (95–100). These medications work through the production of carbon dioxide, increasing intraluminal pressure and forcing the food bolus down the esophagus into the stomach. A combination of sodium bicarbonate, simethicone, and citric acid in 30 mL of water has been studied in combination with glucagon in a case series of 16 patients and was found to be effective without major side effects (95,96). Tartaric acid followed by sodium bicarbonate results in carbon dioxide production and can also assist in advancing the bolus to the stomach (95,97,98). Effervescent soda drinks (e.g., Coca-Cola, Pepsi) may have efficacy via a similar mechanism with respect to carbon dioxide production (98–100). Importantly, this should not be given to patients with a complete obstruction, and the risk of aspiration with ingestion of a large quantity of fluid must be weighed against the potential benefits.

Papain is a trypsin-like enzyme that is available commercially as a meat tenderizer. Initial reports claimed efficacy in digesting impacted food boluses, especially those consisting of meat (101,102). However, later reports demonstrated no reduction in the size of an impacted meat bolus or improvement in bolus passage rates (103). Additionally, reports of transmural esophageal digestion with fatal mediastinitis and hemorrhagic pulmonary edema from aspiration exist, and due to these potential risks, papain is no longer recommended (3,101,104). Patient physical actions with water-soluble contrast medium have been described in a case report, but require further evidence before routine use (105).

Glucagon is often considered one of the first-line medical therapies, with doses of 0.5–1 mg given i.v. theoretically relaxing the distal esophagus and allowing passage of the food bolus (3,53,106,107). Repeat dosing can be given at 5–10 min. Glucagon is secreted from the pancreatic islets of Langerhans α-cells and results in smooth muscle relaxation of the genitourinary and biliary systems and inhibition of gastric, jejunal, and colonic movement (107–110). An initial study found reduced mean resting pressure of the gastroesophageal sphincter following administration of 0.25–0.5 mg i.v. glucagon; however, several studies suggest no benefit compared to placebo, with rates of improvement of 9.4%, 14.2%, and 37.5% in glucagon arms versus 17.2%, 10.3%, and 31.6% in placebo arms, respectively (111–114). Importantly, many patients in these studies received additional interventions, so it is difficult to determine the isolated effectiveness of glucagon. Additionally, glucagon is associated with high rates of nausea and vomiting, which can be problematic in patients with esophageal obstruction (111–114). Of note, patients with underlying esophageal pathology, as well as those with meat impaction, are less likely to benefit from glucagon (3,95,112). Glucagon is contraindicated in patients with insulinoma, Zollinger-Ellison syndrome, or pheochromocytoma (3,95).

Other medication options include hyoscine butylbromide, benzodiazepines, calcium channel blockers, and nitrates (95,115–126). Hyoscine butylbromide is an antimuscarinic and anticholinergic agent with antispasmodic activity (115). Reports are conflicting regarding the efficacy of this medication, and it is contraindicated in elderly patients and those with prostate disease or glaucoma (115,116). Benzodiazepines have been described for management of esophageal impaction, primarily focusing on diazepam 2.5–10 mg given i.v., though the evidence is similarly weak for this medication (107,112,114). Calcium channel blockers (CCBs) reduce smooth muscle tone within the esophagus, and studies suggest that nifedipine 10–20 mg is associated with reduced lower esophageal sphincter and smooth muscle tone (107,112,114,117–122). This medication has been successfully used for other esophageal diseases (e.g., esophageal spasm, nutcracker esophagus, and achalasia) (118,121,122). However, the literature support for esophageal impaction is primarily limited to case reports and retrospective studies (123). Diltiazem and verapamil are other CCBs that reduce lower esophageal pressure and tone (124,125). Nitrates (e.g., isosorbide nitrate) are associated with reduced lower esophageal pressure through metabolism to nitric oxide, resulting in increased cyclic guanosine monophosphate, leading to smooth muscle relaxation (119). Oral nitroglycerin, as opposed to sublingual or i.v. routes, has been suggested to be more beneficial, as it can deliver the medication directly to the site of interest and improve rates of passage, but further study is needed (126). Table 2 discusses the medication options for impacted food bolus.

Table 2. Medication Options for Impacted Food Bolus

Medication	Dose	Considerations
Glucagon (reduces lower esophageal sphincter and smooth muscle tone)	0.5–1.0 mg i.v.	Side effects: nausea, vomiting Contraindications: insulinoma, Zollinger-Ellison syndrome, or pheochromocytoma Unlikely to be effective in patients with underlying esophageal pathology
Hyoscine butylbromide (antimuscarinic and anticholinergic)	10–20 mg i.v.	Side effects: dry mouth, urinary retention, tachycardia, vision changes, sedation, delusions Contraindications: Elderly patients, myasthenia gravis, prostate disease, glaucoma, cardiac disease/failure
Benzodiazepines (reduce lower esophageal sphincter and smooth muscle tone)	Dependent on medication: Diazepam 2.5–10 mg i.v. (most commonly used)	Side effects: sedation, decreased respirations, paradoxical disinhibition, hypotension, ataxia Contraindications: myasthenia gravis, elderly, pregnancy, fall risk, intellectual disability
Calcium channel blocker (reduces lower esophageal sphincter and smooth muscle tone)	Nifedipine 10–20 mg s.l. Verapamil 2.5–5 mg i.v.	Side effects: edema, heart rate change (increase or decrease), dizziness, constipation, redness, headache Contraindications: heart failure, bradycardia, hypotension, elderly patients, infants, hepatic disease
Nitrates (reduce lower esophageal sphincter and smooth muscle tone)	Isosorbide nitrate 5 mg oral or s.l. Nitroglycerin 0.4 mg oral or s.l.	Side effects: headache, lightheadedness, dizziness, flushing, nausea, burning/tingling, pruritis, edema, heart rate change (increase or decrease), hypotension, heart failure Contraindications: current use of phosphodiesterase-5 inhibitor, dehydration/ hypovolemia, bradycardia, hypotension, infants, hepatic disease

s.l. = sublingual.

We recommend discussion of the risks and benefits in a shared decision-making model with the patient before administration of any medication. Although gastroenterologist specialists may request glucagon before endoscopy, evaluation of the literature suggests little or no benefit, and medications should not delay endoscopy (3,53–56). Though there is no strong evidence to support the use of an antiemetic before glucagon, we recommend providing an antiemetic. Administering glucagon i.v. over 1 min, rather than a rapid i.v. push, can also reduce nausea and vomiting (127).

Endoscopy: object type and timing of intervention. Endoscopic indications are similar for pediatric and adult patients, with several specific exceptions. Emergent endoscopic intervention for food bolus may not be needed in a patient who is well-appearing and has no evidence of complete obstruction (3,4,128,129). If medical therapy is effective, endoscopic evaluation is still required to evaluate for the presence of underlying pathology, which can be completed on an outpatient basis if the patient is well-appearing, nontoxic, and has no evidence of perforation (3,53–56,130). However, endoscopy should occur within 24 h if medications are not effective in removing the obstruction, as the presence of an obstruction for > 24 h is associated with increased risk of complications (3,130–133). Removal within 24 h can reduce local pressure-induced mucosal damage to the esophagus, and the risk of major complication is 14 times greater with objects impacted for > 24 h (134). One study found greater rates of esophageal ulceration with odynophagia if foreign bodies were removed by endoscopy after 24 h (71).

The need for and timing of endoscopic intervention for esophageal foreign body depends on several factors, including patient presentation and age; time of ingestion; and the ingested object's size, shape, location, and contents (3,53–56,135–139). Pediatric and adult patients at high risk of aspiration, with complete obstruction, or with evidence of perforation (e.g., fever, tachycardia, ill appearance) require immediate intervention (3,53–56,135–139). A sharp object within the esophagus requires emergent endoscopic removal for pediatric and adult patients (3,53–56,135–139). However, once the object passes through the gastroesophageal junction, endoscopy can be performed on a more urgent basis (i.e., within 24 h) for the majority of ingestions (3,53–56,135–139). One sharp object of particular concern is a plastic clip, such as a bread bag fastener (2,48,140,141). These objects are radiolucent on radiograph and often invisible on CT (2,48,140,141). Unfortunately, the design of this plastic clip results in high risk of bowel perforation, hemorrhage, and obstruction, so endoscopic or surgical intervention is necessary in all cases (48,140,141). A bread bag clip

Table 3. Blunt Object Extraction Procedure

Balloon/Foley Catheter Extraction Procedure for Blunt Objects
1. Obtain balloon device or 8–12Fr Foley catheter, saline flush, barium, 10-mL syringe, tongue depressor, Magill forceps, and airway equipment.
2. Prepare airway equipment, including Magill forceps, in case complication occurs.
3. Measure from the balloon/Foley insertion site to distal esophagus to approximate insertion length.
4. Place the Foley within the nose or mouth and feed down the esophagus.
5. Once the Foley is placed within the esophagus, turn the patient on his/her side in Trendelenburg position.
6. Inflate the Foley balloon with saline or barium and withdraw the catheter slowly for one attempt. Barium allows visualization with radiography, though this can be completed without its assistance in a blind fashion.
7. Sweep the oropharynx after each attempt, or use the Magill forceps, and remove the foreign object if present.
8. Steps 4–7 may be repeated if the first attempt is unsuccessful, but the balloon must be deflated before it is reintroduced.

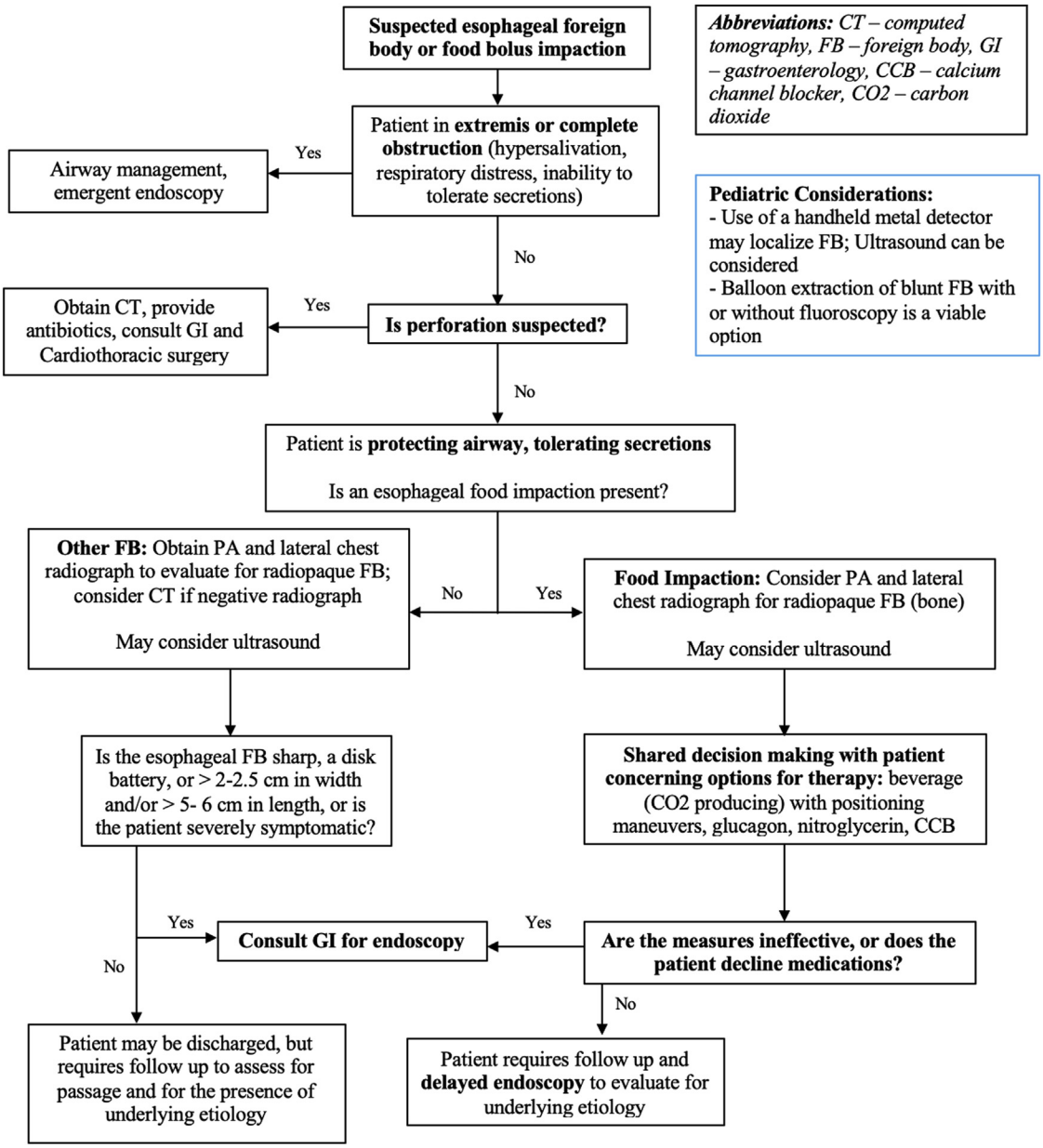

Figure 3. Management of suspected esophageal foreign body or food bolus impaction.

has sharp pincers, which can attach to and trap tissue, resulting in necrosis and perforation (48,140,141).

Blunt objects typically require urgent endoscopic removal if they do not pass completely through the esophagus, with the exception of coins (3,53–56,135–139). If an ingested coin is asymptomatic and < 2.5 cm in width, the patient can be observed for passage (3,53–56,135–139). However, the presence of severe symptoms mandates emergent endoscopic removal, as does the presence of the coin at the level of the cricopharyngeus muscle in a pediatric patient (3,53–56,135–139,142). Objects with a width > 2.5 cm or length > 6 cm should also be removed for both pediatric and adult patients (3,53–56,135–139). If the object passes through the esophagus into the stomach, repeat imaging is recommended on a weekly basis (2,3,53–56,135–139). Button batteries require emergent endoscopic removal, even without symptoms, due to the high risk of esophageal perforation that can occur within hours of ingestion (3,6,14,24,63,136,143–146). A button battery generates an electric current resulting in hydrolyzation of fluid and hydroxide production, with leakage of alkaline substances (14,24,145). These mechanisms result in liquefaction necrosis and mucosal injury (14,24,145). Lithium button batteries > 2 cm are associated with the greatest risk of complications (145,146). Cylindrical batteries should also be removed emergently, though there are few data available for this group (2,3). Ingested magnets (or single magnet in combination with another metallic object) warrant emergent removal, as an ingested magnet can stick to the other magnet or metallic object across intestinal walls, resulting in obstruction, ischemia, perforation, or fistula formation (3,53–56,136). Ingestion of a single magnet will likely pass through the gastrointestinal tract without complication, though the American Society for Gastrointestinal Endoscopy (ASGE) recommends removal if the magnet is within endoscopic reach (3).

Endoscopic intervention. Flexible endoscopy is most commonly used for diagnosis and removal, with low risk of complication (3,53,56,135–139). Endoscopy also allows for diagnosis of underlying esophageal conditions. The decision to extract the foreign body, or most likely with food bolus, advancement into the stomach, is up to the endoscopist. Extraction can be complicated and may require piecemeal removal (53,147–151). Food impactions are associated with a high incidence of esophageal pathology, and guidelines state bolus advancement may result in higher risk of tissue injury (53,147–151). Extraction is utilized for large, firm food boluses that contain bones or sharp materials (3,147,151).

The ASGE recommends against advancement into the stomach before evaluating the esophagus distal to the site of obstruction (3,31,131,133). However, several studies evaluating impaction advancement into the stomach utilizing gentle pressure to the center of the bolus, found no increase in the risk of perforation (5,148–151). Caution is recommended in the setting of known esophageal pathology, if resistance is met with endoscopy or if the patient has experienced recurrent food bolus impaction (3,53,56).

Balloon/Foley catheter extraction in the emergency department. Using balloon extraction, or a Foley catheter, with or without fluoroscopy for esophageal foreign bodies is a technique described for removing coins or other blunt objects (152–155). Indications include a single, flat, and blunt object; the patient should have no known esophageal pathology; the object has been in place < 72 h; and the object is partially obstructing the esophagus (152–155). This procedure is most commonly utilized for pediatric patients. As most adults with esophageal foreign body have underlying esophageal pathology, balloon extraction is typically not utilized for this population. Multiple objects, an object in place > 72 h, or total esophageal obstruction mandates endoscopy. Using a Foley catheter or other device can be successful in up to 88% of cases, with low rate of complications (152–155). Table 3 describes the technique. Of note, the procedure can be completed with fluoroscopic guidance, with barium to inflate the balloon/Foley catheter, or it can be completed without fluoroscopic assistance.

Figure 3 depicts an author-recommended algorithm for evaluation and management of ingested foreign object or impaction, based on current literature. Uncooperative patients or those at high risk of aspiration may require endotracheal intubation before the endoscopy (3,53–56).

Disposition

If the foreign body or impaction resolves in the emergency department (ED), or if the patient receives endoscopy and recovers without complications, the patient may be appropriate for discharge. Patients with persistent symptoms, inability to tolerate oral liquids, or with non-resolution after endoscopy should be admitted for further observation and management (3,53–56). Given the high rate of underlying esophageal pathology, follow-up with gastroenterology is recommended (3,53–56,156,157). Patients who improve without endoscopic interventions still require follow-up and outpatient endoscopy (3,53). If the ingested foreign body or food occurred in a pediatric patient, it is important that parents are

educated about home care and avoidance of high-risk food and objects (3,53–56).

CONCLUSIONS

Esophageal obstruction typically improves spontaneously but may require emergency medicine care. Pediatric patients are the most common patient population affected. Focused history and examination are required, focusing first on the patient's airway. First-line imaging includes plain radiography, though this test is not required in the setting of suspected nonbony food bolus. CT is needed if there is a suspicion of perforation or other complication. Medications demonstrate poor efficacy, including glucagon, effervescent agents, CCBs, benzodiazepines, and nitrates. A shared decision-making model is recommended before administering these medications due to poor efficacy and high risk of side effects. Endoscopy is the most efficacious therapy, and gastroenterology should be involved early in these cases. Early emergent endoscopy is associated with improved patient outcomes in patients with complete obstruction. If the obstruction resolves in the ED without endoscopy, outpatient endoscopy on a routine basis is recommended.

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ARTICLE SUMMARY

1. Why is this topic important?

Patients with esophageal foreign bodies or food bolus impaction may present to the emergency department with variable symptoms ranging from mild to severe distress. However, there is little emergency medicine–focused literature concerning these conditions.

2. What does this review attempt to show?

This narrative review provides evidence-based recommendations for the assessment and management of patients with esophageal foreign bodies and food bolus impactions.

3. What are the key findings?

Though esophageal foreign bodies and food bolus impactions may present with a variety of symptoms, complete obstruction can lead to inability to tolerate secretions, airway compromise, and even death. Pediatric patients are the most common population affected by esophageal foreign body. In the adult population, edentulous patients are at greatest risk. Obstruction typically occurs at sites of narrowing due to underlying esophageal pathology. History and examination are keys in diagnosis, and plain radiograph of the chest is the preferred test. However, if radiograph is limited or there are concerns for perforation, computed tomography is recommended. Various medications, including glucagon, have been evaluated for use, but literature suggests poor efficacy. Shared decision making with the patient is recommended before their administration. Endoscopy is the intervention of choice, with early endoscopy for complete obstruction associated with improved patient outcomes.

4. How is patient care impacted?

Knowledge of the presentation, evaluation, and management of patients with esophageal obstruction or food bolus impaction is important for emergency clinicians, as this knowledge may optimize patient outcomes.