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Esophageal Foreign Bodies

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OBJECTIVES

After completing this article, readers should be able to:

1. Describe the most frequent presenting symptoms of esophageal foreign bodies.
2. List the three areas where esophageal foreign bodies commonly lodge.
3. List the investigative study that should be obtained in all cases of a suspected lodged foreign body.
4. List the four basic strategies to remove esophageal foreign bodies.
5. Delineate the percentage of foreign bodies that can be removed safely from the esophagus.

The natural curiosity of children leads them to ingest many types of objects other than food. Inevitably, some of these objects become lodged in the esophagus, and the pediatrician then is faced with the challenge of determining how to remove such a foreign body.

Thousands of children in the United States present with foreign bodies lodged in the esophagus each year. Most of these children are 4 years of age and younger, and boys comprise a slight majority. Children who have a lodged esophageal foreign body usually present for care between the hours of noon and midnight and usually within 6 hours of the foreign body ingestion. By far, coins are the foreign bodies detected most commonly. Other reported objects include but are not limited to those listed in Table 1.

Presenting Signs and Symptoms

The most frequent presenting symptoms are dysphagia, drooling, retching, and vomiting. However, infants and children also may experience coughing, choking, and significant airway compromise from foreign bodies lodged in the upper half of the esophagus (Table 2). In most cases, a history of foreign body ingestion can be obtained from a parent, a caretaker, or the child. It is important to try to determine how long the foreign body has been

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TABLE 1. Commonly Found Esophageal Foreign Bodies in Children

• Coins
• Food
• Small metal and plastic toys
• Buttons
• Bones
• Batteries
• Pins/safety pins/thumbtacks
• Wood
• Glass

present because those lodged for longer than 24 hours create a greater risk for erosion or other damage to the esophagus. This, in turn, will affect the choice of procedure for removing the foreign body.

Locating the Foreign Body

There are three areas of anatomic constriction in the esophagus where ingested foreign bodies are predisposed to lodge: 1) the proximal esophagus at the level of the cricopharyngeal muscle and thoracic inlet (the foreign body will be seen at the level of the clavicles on chest radiograph), 2) the middle esophagus at the level of the carina and the aortic arch, and 3) the distal esophagus just proximal to the esophageal-gastric junction (the foreign body will be seen two to four vertebral bodies above the stomach bubble on chest radiography). In addition, for-

foreign bodies may lodge in esophageal strictures that have resulted from pre-existing conditions, such as an anastomotic site from an esophageal atresia repair or scarring from ingestion of a caustic substance. The most common site for foreign bodies to lodge is at the upper esophagus at the level of the thoracic inlet. If the foreign body is a coin, it always will be oriented in a transverse position because the opening of the esophagus is widest in a transverse position (Fig. 1).

A chest radiograph should be obtained in all cases of a suspected lodged foreign body. This allows the examiner to determine the precise location of the foreign body within the esophagus or to confirm that the foreign body has moved beyond the esophagus, thereby often obviating the need for a retrieval procedure. In some cases, a child will be referred from another office or center along with a radiograph. If some hours have passed prior to evaluation in the referral center and if a retrieval procedure is being considered, it is prudent to repeat the radiography to confirm that the foreign body still is present in the esophagus. If findings from a history and physical examination suggest a lodged esophageal foreign body, but none is visible on

TABLE 2. Common Signs and Symptoms of Lodged Esophageal Foreign Bodies

• Dysphagia
• Drooling
• Vomiting
• Anorexia
• Cough
• Choking/cyanosis
• Wheezing
• Hemoptysis
• Upper respiratory tract infection/pneumonia
• Cervical/chest pain
• Fever

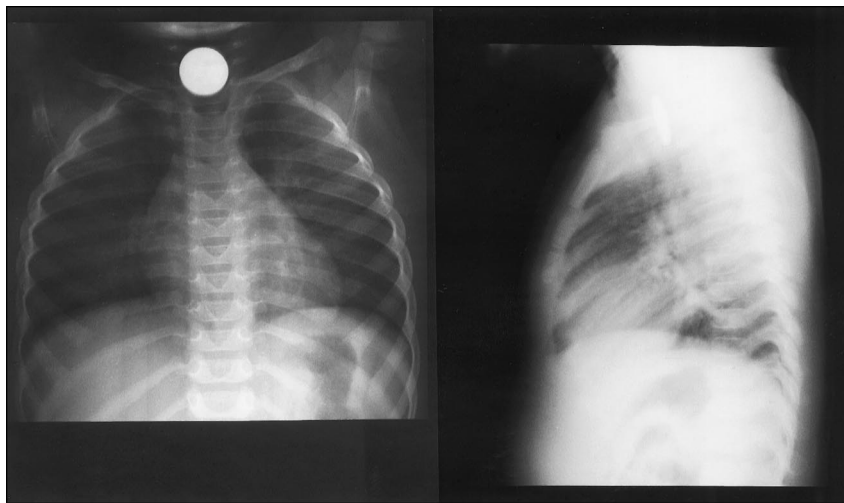


FIGURE 1. Anteroposterior (left) and lateral (right) radiographs showing a coin lodged in the proximal portion of the esophagus. Note the transverse orientation of the coin.

plain chest radiography, contrast esophagography should be considered to rule out the presence of a radiolucent foreign body (Fig. 2).

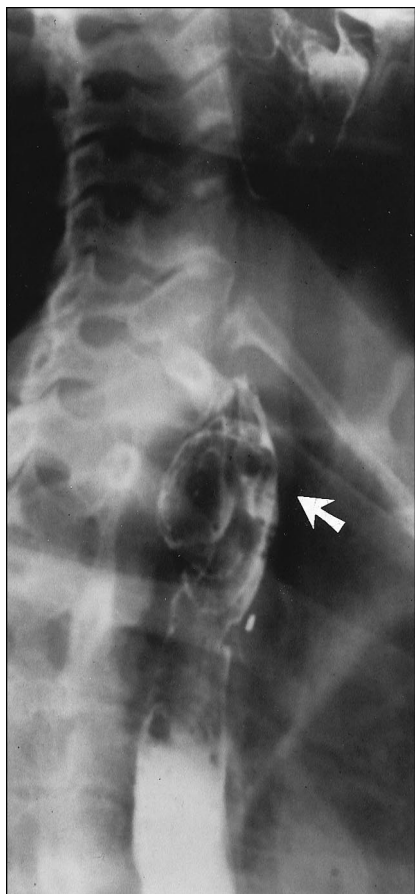


FIGURE 2. Lateral view of an esophagogram outlining a lodged radiolucent foreign body (arrow) in the proximal portion of the esophagus.

Removing the Foreign Body

Four basic strategies are used to remove a lodged foreign body: 1) removal using rigid or flexible esophagoscopy, 2) extraction using a balloon catheter under radiographic guidance, 3) pushing of the foreign body into the stomach by using bougienage, and 4) temporization, which allows the foreign body a chance to pass into the stomach on its own if it is lodged in the distal portion of the esophagus. The strategy used depends on the type of foreign body, the length of time it has been lodged, and the relative experience with one or more of these techniques at a particular center. The success rate for removal of foreign bodies from the esophagus is

95% to 100%, regardless of the technique used.

ESOPHAGOSCOPY

Esophageal foreign bodies are retrieved most commonly by using esophagoscopy, with the rigid esophagoscope (Fig. 3) used more commonly than the flexible esophagoscope. The advantages of rigid esophagoscopy include: 1) excellent visualization of the esophagus, 2) a variety of types and sizes of extraction instruments, 3) the ability to examine the esophagus directly after removal of the foreign body, and 4) a virtually 100% success rate. In addition, because the procedure is performed under general anesthesia, the airway is protected, the child is in no discomfort, and there is a great element of control over both the patient and the procedure. The relative disadvantages are the small risks of a general anesthetic and the greater cost of this procedure compared with any of the other techniques.

Rigid esophagoscopy is performed in an operating room under general anesthesia. The child is intubated, and the neck is flexed slightly while the head is extended slightly (ie, the “sniffing” position). The esophagoscope is introduced, and once the foreign body is in view, the telescope is removed from the sheath and a grasper with an attached telescope is introduced into the sheath (Fig. 4). The foreign body is grasped, and the sheath and telescope are removed together. The

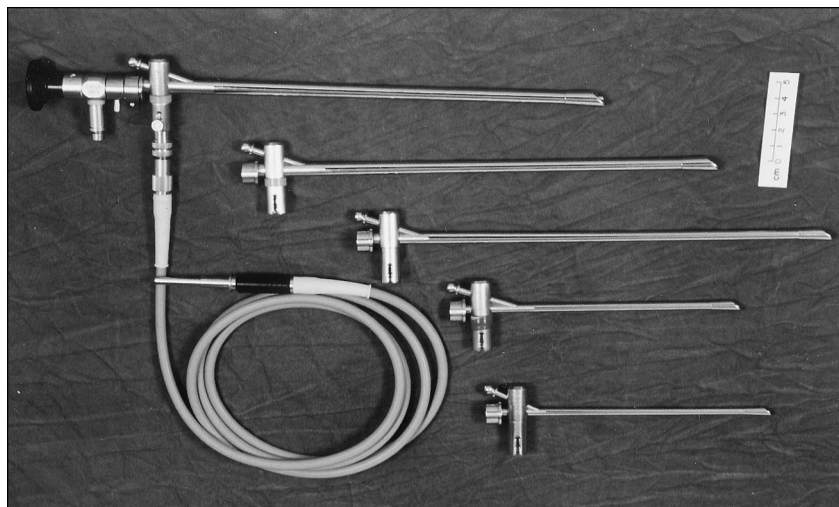


FIGURE 3. Rigid esophagoscopes are available in varied lengths and diameters.

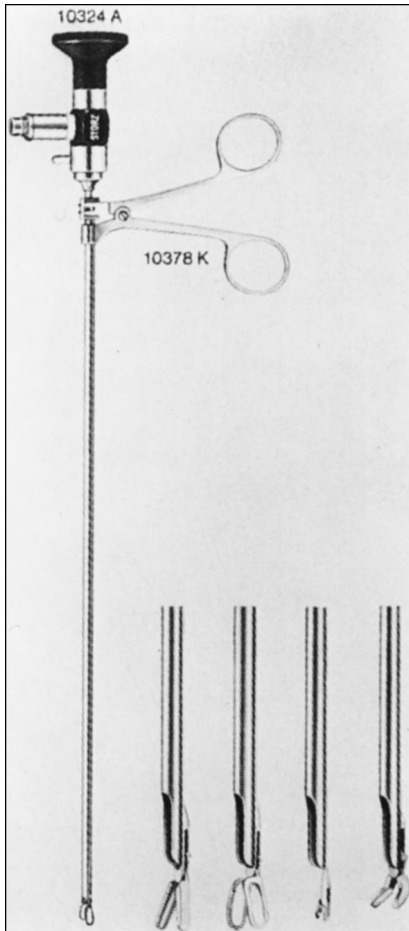


FIGURE 4. Representative rigid telescopic extraction instruments. A grasper is attached to the end of a sheath through which a telescope is passed. This apparatus, in turn, is passed through the esophagoscope sheath. (Photo used by permission).

esophagoscope then may be reintroduced to assess the esophagus for any injury from the foreign body. A postprocedure chest radiograph is obtained to rule out pneumomediastinum.

Flexible esophagoscopy may be undertaken with a child under sedation and without intubation. Once the scope is passed, a variety of flexible graspers, forceps, baskets, and magnets can be passed through the instrument channel to retrieve the foreign body. These instruments generally are smaller than those that can be passed through a rigid esophagoscope. The flexible esophagoscope is most useful for retrieving foreign bodies in the middle-to-lower esophagus, stomach, and duodenum. The view through the flexible esophagoscope in the phar-

ynx and upper esophagus tends to be obscured by mucosal folds. The rigid esophagoscope is a better choice for removing foreign bodies in these areas if esophagoscopy is chosen as the method for retrieval.

EXTRACTION BY BALLOON CATHETER

An increasingly popular method of removing esophageal foreign bodies is extraction by balloon catheter under radiographic guidance. This method has the advantages of avoiding a general anesthetic and being much less expensive than esophagoscopy extraction. The disadvantages are that the object is not viewed directly, damage to the esophagus from the foreign body or the extraction procedure may not be detected initially, the airway is not protected, and the child may experience distress. Nonetheless, this has been a very effective as well as cost- and time-efficient procedure in many centers.

Extraction of a foreign body with a balloon catheter requires that the

child be calm and that the foreign body be smooth and generally lodged for fewer than 72 hours. A stricture from a pre-existing condition may be a relative contraindication to balloon extraction, but this technique has been used successfully even in this situation. Sedation is not used, so the child can protect his or her airway. A well-stocked “crash cart” and health professionals well trained in resuscitation procedures must be available. If the child is an infant, swaddling on a papoose board can be helpful. Toddlers may be secured on a larger backboard or calmed and held by a parent or caretaker. The child is placed in an oblique-prone position with the head down. Under fluoroscopic guidance, a balloon catheter of a size appropriate to the child (usually a #12 French Foley catheter) is passed through the nose or the mouth and beyond the foreign body. The balloon then is inflated with thin barium or water-soluble contrast material to the width of the esophagus. The catheter is gently withdrawn,

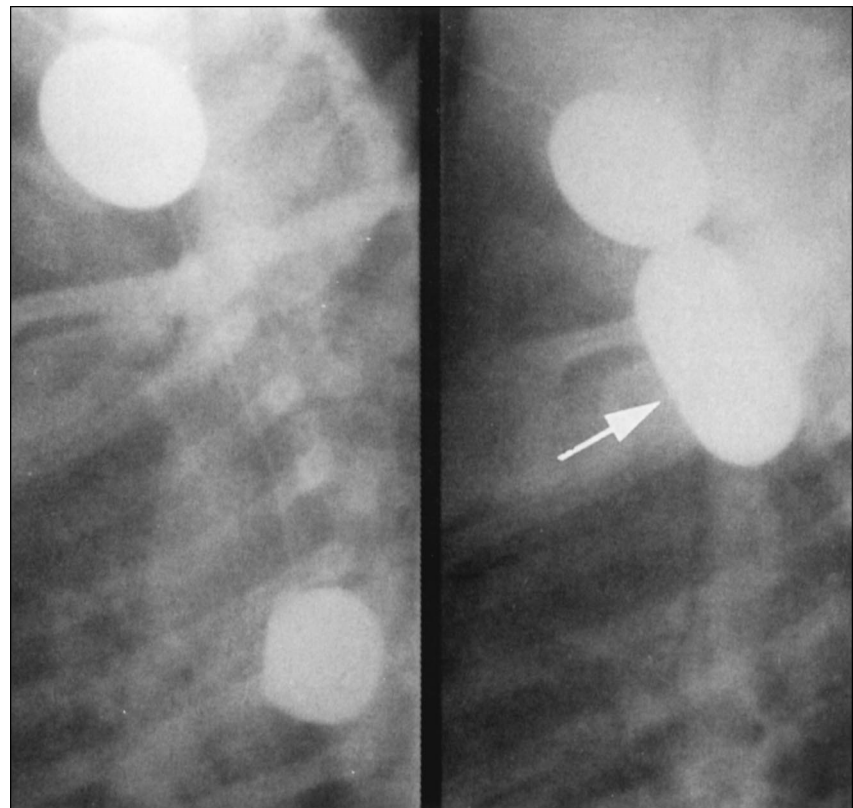


FIGURE 5. Radiograph showing a contrast-filled balloon catheter advanced beyond a coin lodged in the proximal esophagus (left). The catheter (arrow) is withdrawn under fluoroscopic guidance, thus allowing removal of the coin (right). (Photo used by permission.)

bringing the foreign body with it (Fig. 5). The foreign body is expectorated or gently removed from the mouth after placement of a bite block. Occasionally, the foreign body may pass into the nasopharynx, but moving the patient to the decubitus or supine position usually allows the foreign body to fall back into the pharynx or the oral cavity for removal. A McGill forceps may be helpful for retrieval.

If the procedure has progressed smoothly, no further studies are required, and the child may be discharged home. If there has been any difficulty or if blood is present on the foreign body or the catheter, contrast esophagography is suggested to rule out injury to the esophagus. Recently, the balloon catheter technique has been used simply to push the foreign body into the stomach where it can pass through the gastrointestinal tract on its own.

BOUGIENAGE

Esophageal bougienage is used less frequently than other techniques, but still is a successful method of removing foreign bodies from the esophagus. Certain criteria must be met. The foreign object must be smooth; its ingestion must have been witnessed; the object must have been lodged for fewer than 24 hours; presence of the object in the esophagus must be confirmed on radiography; there should be no history of previous esophageal disease, surgery, or stricture; the child should have no pulmonary compromise; and trained personnel who are capable of performing resuscitation maneuvers should perform the procedure. Bougienage is performed in the emergency department by having the nonsedated child sit upright. A well-lubricated blunt-tipped Hurst bougie dilator of the appropriate size is passed through the mouth sufficiently to push the object into the stomach. After confirmation of the new position of the object by radiography, the child is discharged. The parents are instructed to watch for passage of the object and to contact the physician should the child experience any subsequent abdominal pain.

TEMPORIZATION

Temporization may be an option if a child presents within 24 hours of ingesting a foreign body, the object is smooth, and it already is in the distal esophagus. A radiograph is performed 24 hours from ingestion. If the object has passed into the stomach, the parents only need to watch for its passage in stool. If the object remains in the esophagus, it can be retrieved by any of the methods already discussed. It is noteworthy that temporization sometimes is useful for soft food or meat that is impacted in the distal esophagus.

SHARP OBJECTS AND BATTERIES

Special considerations are required for ingested sharp objects and batteries. A sharp object in the esophagus is removed best upon presentation and must be removed under direct vision with a rigid or flexible esophagoscope. The rigid scope may allow withdrawal of the object into the sheath for atraumatic removal. Alternatively, an overtube can be used with a flexible esophagoscope. If an object, such as an open safety pin, is lodged in the esophagus with the sharp end pointing cephalad, it can be pushed into the stomach, turned around, and withdrawn safely via the blunt end. Once a sharp object has passed into the stomach, it usually will pass on its own. It probably is better to let such objects pass rather than risk injury to the esophagus by attempting removal. Such cases must be assessed individually to determine whether the foreign body is too large to pass from the stomach, thereby necessitating removal.

A battery lodged in the esophagus should be removed immediately, although a battery may be observed initially in the stomach. In such cases, repeat radiography should be obtained 24 hours from initial presentation. If the battery still is in the stomach, it should be removed endoscopically. If the battery passes into the intestine, it should be followed with a radiograph every 3 to 4 days to be sure it is progressing through the gastrointestinal tract. Abdominal pain may be an indication for surgical removal.

Complications

All of the methods for esophageal foreign body removal discussed previously are very successful when chosen appropriately. However, complications may arise from lodged esophageal foreign bodies or from the procedures to remove them. Foreign bodies that are lodged for a prolonged period of time, sharp objects, or batteries are most prone to causing erosion or perforation of the esophagus, tracheal compression, mediastinitis, esophagus-to-airway fistulas, esophagus-to-vascular fistulas, extraluminal migration of the foreign body, and false esophageal diverticula. Complications arising from esophagoscopy include those related to anesthesia, injury to the esophageal mucosa, bleeding, and perforation. Finally, complications arising from removal via the Foley catheter include epistaxis, vomiting, transient airway compromise, and esophageal mucosal injury or perforation. Overall, however, the rate of complications generally is reported to be less than 2%.

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